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CONTENTS.

Editorial Notes	341
Information for Stockholders	342
Gold Movement in 1901	342
Mining Law for the Philippines	343
*Bitumen in Cuba.....*Dr. T. Wayland Vaughan.*	344
Iron and Steel Works of United States..*James M. Swank.*	347
*Coal Cutting by Machinery in British Collieries, *Sydney F. Walker.*	348
Rutile Mining in Virginia.....*F. P. Merrill.*	351
The Mineral Wealth of Indo-China	351
Progress at Idaho Springs.....*H. Foster Bain.*	351
The Minnequa Wire Mill	352
Commercial Cyanide of Potassium....*Russell W. Moore.*	352
Free Sulphur in Beaumont Petroleum, *C. Richardson and E. C. Wallace.*	352
Recent Decisions	353
Abstracts of Official Reports	353
New Publications	355
Correspondence	355
Questions and Answers	355
*A Safety Appliance for Hoisting Engines	356
*The McKenna Automatic Water Still	356
*Patents	357

*Illustrated.

DEPARTMENTS

Assessments	365
Chemicals, New York, Liverpool	367
Coins, Foreign	369
Dividends	365
Financial Notes	368
Industrial Notes	358
Markets: Coal, United States and Foreign	366
Iron and Steel	366
Metals: Gold, Silver, Copper, Tin, Lead, Spelter, Antimony, Platinum, Quicksilver, etc	369
Minerals: New York, Liverpool	367
Mining News: United States and Foreign	359
Mining Stocks: United States and Foreign	365
Obituary	358
Personal	358
Prices Current of Chemicals, Minerals, etc	372
Schools, Technical	358
Societies	358
Stock Market Review: United States and Foreign	365
Stock Quotations	370, 371
Trade Catalogues	359

AS THE question of the future relations between the Island of Cuba and the United States is attracting much attention at the present time, any information bearing on the economic resources of the island are interesting and timely. We give in another part of this issue an exhaustive paper on the Bitumens of Cuba, by T. Wayland Vaughan, one of the three geologists detailed at the request of Governor-General Wood to make a reconaissance of the island.

⚒

A PART of the entertainment provided for Prince Henry of Prussia on his recent visit to New York was a luncheon at which he was presented to a company of American citizens who have been prominently identified with our industrial development and who were designated upon that occasion as "Captains of Industry." It is a fact worth noting, that of the ninety-two "captains" present at the luncheon, twenty-one, or more than 20 per cent, were members of the American Institute of Mining Engineers. No other society or organization can boast of such a representation, which in this case included mining engineers, geologists, metallurgists, inventors, chemists and administrators whose works have won world-wide recognition. The incident illustrates the wide range of the Institute's influence.

⚒

THE LATEST boom in copper mines reported is from Rhodesia, where large deposits of copper ores are reported to have been discovered. It is stated that these were pointed out—as were some of the Rhodesian gold mines—by ancient workings of considerable extent. Not very much information has been given about the new mines, but a company known as the Consolidated African Copper Trust, with a capital stock of $3,000,000, has been organized to work them. It has the backing of such a large concern as the Consolidated Goldfields of South Africa, and it is also reported that the De Beers Company is interested. With such backing the stock will probably be taken in London, though the information given to the public is of rather a meager character.

⚒

SOME IDEA of the waste which attended the earlier mining and marketing of anthracite coal is shown in the present recovery of valuable fuel from the old culm banks, and what was formerly a waste and expense is now a source of profit. The annual report of the Delaware, Lackawanna & Western Railroad published in another column states that 822,000 long tons of merchantable coal were obtained last year by the washeries located at the old culm banks. The recovery of this product has proved so profitable that the construction of an additional washery has been decided upon. The operations of this company represent about 12 per cent of the total anthracite production. A proportionate recovery from the culm banks by all anthracite producing companies would mean a total product from this source last year of about 6,500,000 tons, or about 10 per cent of the total anthracite output.

⚒

We extend our cordial congratulations to the *Manufacturers' Record* of Baltimore, upon the completion of the second decade in its successful career, and upon the excellence of the special number published on February 20, in celebration of the anniversary. The *Manufacturers' Record* entered the field at the proper time for the particular work to which it is devoted, the industrial development of the Southern States, and it has developed and grown great with them. Twenty years ago the Southern States were just beginning to rise industrially from the ashes of the dead Confederacy. During those two decades that section of our country has made a record unsurpassed in history, and which challenges the admiration of all the world. The New South of Henry W. Grady has arrived. The story is graphically presented in the review contributed by different authorities to the special number of the *Manufacturers' Record*, which is published as Part II of the regular issue of February 20. These reviews cover 92 pages, and are replete with interesting matter, alike flattering to the past and encouraging for the future.

⚒

ACCORDING to data given the report of the Delaware, Lackawanna & Western Company for 1901, the average amount received by that company for anthracite coal sold was $3.57 per ton. This includes coal sold at the mines, at points on the company's lines at varying distances from the mines, and coal delivered at tidewater and to connecting lines. The total cost per ton may be calculated from the figures given in the report as below:

	Cost.	Per cent. of total.
Mining and preparations	$1.50	45.2
Transportation	1.63	49.1
Agencies, commissions, etc	0.18	5.4
General expenses	0.01	0.3
Totals	$3.32	100.0

The cost of mining and preparation seems to have been but slightly increased by the higher wages which prevailed last year. The cost of transportation and selling, as former years, formed considerably over one-half of the expenses.

⚒

A cable despatch announces the death of Leonard Lewisohn, head of the great firm of Lewisohn Brothers, in London, on March 5th. Mr. Lewisohn was on his way to Carlsbad, where he intended to take the baths, his health having been affected by his attention to business during the past few years. A slight cold developed an attack of pneumonia, from which his enfeebled system could not recover. Mr. Lewisohn was 54 years of age. He had long been a prominent figure in the metal trade, and took an active part in the organization of copper mining companies in Montana and in the Lake Superior country. He also was a leader in the organization of the American Smelting and Refining Company and the United Metals Selling Company.

Mr. Lewisohn was a remarkable man, possessing great business ability and a keen appreciation of the possibilities of the metal trade in this country. A review of his life and work will appear in this paper next week.

⚒

SO GREAT has been the demand for iron and steel in this country that producers whose books are full with long-time orders have been obliged to buy abroad. In January our imports were nearly double

what they were a year ago, while our exports have decreased about 16 per cent. The imports for January this year were valued at $2,068,804, as compared with $1,361,034 in January, 1901. The most important increases were shown in steel billets, hoops, and sheets, tin-plates, pig iron and iron ore. Most of our imports came from Germany and Great Britain. This buying of foreign products on a large scale is only temporary, and judging from the numerous inquiries received and orders booked by our manufacturers we may expect an improvement in exports in the not distant future. In fact preparations are already being made to meet the increased domestic and foreign demand by enlarging the producing capacity of many of our steel works.

⚒

THE ONLY gold mine in Great Britain which is now being worked is that of the St. David's Gold and Copper Mines, Limited, and that company has just made its report for 1901. The existence of gold deposits in Wales has been known for many years, and they have been worked in a small way at various times; but systematic operations with modern machinery on a large scale were first undertaken about two years ago. The company seems to have met with a fair degree of success. Last year the mill treated 15,500 tons of ore, which yielded 5,537 ounces of bullion valued at $95,649, with concentrates valued at $2,915; a total of $98,564, or $6.36 per ton. As the total expenses were only $31,854, a satisfactory profit remained. The output was restricted by a short supply of water resulting from a dry season, and by failure to receive additional machinery which had been ordered. The recovery of concentrates has been poor, owing to the friable nature of the ore, a trouble usually encountered in Wales. The directors are now erecting an Elmore oil concentration plant, by which the recovery should be nearly complete. There seems to be plenty of ore in sight of moderately low grade, but with modern methods of treatment there should be plenty of chances of success.

⚒

TEXAS OIL AND ROYALTY.

This is not euphonism merely. The Hon. James Stephen Hogg, ex-governor of the great State of Texas, is now in England as the representative of large oil-producing interests in Beaumont, and for the purpose of securing the investment of English capital in one or more enterprises with Beaumont oil as the base. We have not learned yet with what success his financiering schemes have been attended, but socially he appears to have "gotten there" with his full complement of pedal attachments. If the program as outlined in the press dispatches has been carried out, Governor Hogg was presented to King Edward at the levee yesterday by Mr. Choate, the American Ambassador. It goes without saying that Governor Hogg comported himself creditably, and made a ten-strike for Texas and Beaumont oil. He is a man who can readily adapt himself to local conditions. Under the warm rays of a Texas sun, and in the heat of a political campaign, he can make himself at home among his farmer constituency and sit comfortably at table *sans* coat and collar, nor gag at substituting knife for fork if necessary or expedient. He is equally at home in the drawing room of more polite society. He will make no *faux pas* at the King's levee.

Any one who has met the ex-governor recognizes the fact that he carries weight. He has a winning and convincing way. With the prestige given to him among Englishmen by his presentation to royalty he will probably have little difficulty in extracting good English gold from the purses of London financiers, and replacing it with certificates of stock in Beaumont oil companies.

Moreover, the ex-governor is reformed. Time was, and not so remotely, that anything smacking of wealth, corporate or individual, or of plutocracy and monopoly, brought forth in condemnation all the oratorical powers of the Texas statesman. But oil cleared his vision, and he now arrays himself on the side of capital, industry and progress. After he has attained his usual success in this errand, there is another field in which he can work a reform among his fellow citizens. Texas has the reputation, not undeserved, of hostility to capital, and there is much needed remedial legislation on these lines in the State. Governor Hogg can do much to effect it. He will not have lost caste among his fellow Texans, for has he not declined to array himself in court costume and thus upheld the cause of democracy for which he stands and pleads? We will look for great things for all sides of the oil question as a result of this interesting incident.

⚒

INFORMATION FOR STOCKHOLDERS.

Some of the large stockholders of the Old Dominion Mining Company, which has headquarters in Boston and mines in Arizona, are taking steps to secure at the forthcoming annual meeting of the company such representation in its directory as well permit an acurate knowledge of its prospects and affairs to be obtained. The Old Dominion is one of the enterprises under the Bigelow management, which we have time and again critised unfavorably for its policy of secrecy toward its own stockholders, but this appears to be a particularly flagrant case. For many years it has made no report of any kind, and not even the holders of many thousands of shares have been able to learn definitely as to the precise condition of things at the mines or as to the financial position of the company. It is difficult to see how a presumably honest management is able to defend such a policy. Publicly there has been no defence, only a stolid silence; although the movement now under way is inspired by interests which are well worthy of attention. The excuse is offered (unofficially) that the development of the Old Dominion property has been attended by difficulties with which the management has had a hard wrestle; which could not advisably be disclosed to the stockholders. We do not know why. The yield of a mine is determined chiefly by the bounty of nature; there are no trade secrets in connection with it that must be withheld from competitors. There is no reason why the fullest possible information should not be imparted equally to all stockholders, large and small, and a competent and honest management should have no fear of the consequences of such frankness. We have never heard that the Stanton mines at Lake Superior have suffered because of it; nor any other that has pursued the same policy. There are suspicions that the Old Dominion has been managed of late rather in the interest of the Amalgamated Copper Company than in that of its own stockholders. These suspicions may be ill-founded—we express no opinion as to that—and even if they be apparently true nothing worse than an error in judgment may be involved; such a question generally has two sides. But failure to inform its shareholders as to the transactions of the company is another matter, and we hope that the interests which are now acting with respect to it will obtain sufficient proxies to command attention at the forthcoming annual meeting.

GOLD MOVEMENT IN 1901.

The increase in the production of gold in the United States was referred to in the ENGINEERING AND MINING JOURNAL of January 4 last; and though exact figures of production are not yet obtainable, a pretty close approximation to the amount of our gold supplies can now be given. In the following table the production, imports and exports for the year are shown, in comparison with those for the previous year:

	1900.	1901.	Changes.
Imp's, ore and bullion	$34,704,290	$33,523,884	D. $1,180,406
Imports in coin.....	32,044,794	21,237,996	D. 10,806,798
Total imports.....	$66,749,084	$54,761,880	D.$11,987,204
Production in U. S...	78,159,674	81,150,000	I. 2,990,326
Total supplies.....	$144,908,753	$135,911,880	D. $8,996,878
Exports in all forms..	54,134,623	57,729,889	I. 3,595,266
Balance retained..	$90,774,135	$78,181,991	D.$12,592,144

Of the exports in 1901 the sum of $47,941,040 is reported as in ore and bullion, and $9,788,849 in coin; against $34,762,763 and $19,371,860, respectively, in 1900.

The gold imports for the year were from the following sources, as reported by the Bureau of Statistics of the Treasury Department:

Imports of Gold into the United States.

	1900.	1901.	Changes.
Canada	$26,543,182	$25,267,925	D. $1,275,257
Mexico	5,071,296	7,792,030	I. 2,720,734
Central America...	543,181	699,922	I. 156,741
West Indies.....	491,013	1,738,192	I. 1,247,179
South America.....	482,617	1,254,240	I. 771,623
Total America...	$33,131,289	$36,752,309	I. $3,621,020
France	$1,788,562	$1,179,275	D. 609,287
Germany	756,342	.....	D. 756,342
Great Britain.....	6,614,758	254,858	D. 6,359,900
Total, Europe...	$41,348,343	$50,649,692	I. $9,399,549
Japan	6,947,494	4,019,580	D. 2,927,914
Australasia	17,088,380	12,461,921	D. 4,626,459
Other countries....	422,259	93,937	D. 328,322
Totals.....	$66,749,084	$54,761,880	D. $11,987,204

It will be seen from this table that our principal imports in 1901 were from Canada, Australia, Mexico and Japan. Europe sent us very little gold last year, notwithstanding the apparently large trade balance in our favor; though it may be said that a considerable part of the gold from Australia was probably remitted here on British account. The gold from Canada was almost entirely from the Yukon, and came to this country because a very large proportion of the mines are owned by Americans and worked on American account; while most of the supplies for the region were drawn from this country. This condition of affairs will probably continue for some time to come. The imports from Japan represent a trade balance due us, which was largely increased during the past two years by purchases of war ships and railroad material.

The exports of gold for the two years, as reported by the Bureau of Statistics, are shown in the following table:

Exports of Gold from the United States.

	1900.	1901.	Changes.
Canada	$5,810,523	$3,388,654	D. $2,421,869
West Indies.....	2,326,134	946,165	D. 1,379,969
Other N. America..	261,065	70,555	D. 190,510
South America....	3,994,340	1,026,150	D. 2,968,190
Total America...	$12,392,062	$5,431,524	D. $6,960,538
France	$17,159,481	$34,213,129	I. $17,053,648
Germany	5,122,269	14,799,900	I. 9,677,631
Great Britain.....	18,966,593	1,635,663	D. 17,330,930
Total, Europe...	$41,348,343	$50,649,692	I. $9,399,549
China	206,472	281,497	I. 75,025
Other countries....	287,746	1,368,176	I. 1,080,430
Totals.....	$54,134,623	$57,729,889	I. $3,595,266

The gold sent to Canada was simply in transit, and represented only a small part of that received, the greater part being retained here, as noted above. The important feature of the statement is found in

the large exports of gold to Europe, almost entirely to France and Germany. The reason for these exports has been much discussed, and the nearest approach to probable causes seems to be that gold went to Germany in payment for securities, and to France in repayment of loans made at an earlier date. At any rate, these are the reasons most generally accepted.

In 1900 our exports of gold were less by $12,614,061 than the imports; while in 1901 the exports exceeded the imports by $2,968,009. Nevertheless the gold in the country increased in round figures $78,000,000 during the year, of which probably $20,000,000 passed into circulation, or at least into monetary form and a basis for paper circulation. How much more went out of the country in the various forms which the custom houses do not register, it is impossible to say; but the amount was probably no larger than in ordinary years. As long as we are producing gold at the present rate our stock of the metal can stand any ordinary drafts that may be made on it from abroad. The quantity used in the arts and in the various purposes for which gold is employed was undoubtedly very large last year, and will account for the rest of the stock.

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MINING LAW FOR THE PHILIPPINES.

House Bill No. 7925, introduced in the House of Representatives, January 7, 1902, by Mr. Cooper, of Wisconsin, and referred to the Committee on Insular Affairs, is a bill "to provide for the administration of civil affairs in the Philippines, and for other purposes." Inasmuch as its provisions will doubtless be amended in committee, and must subsequently pass the test of debate in the House, as well as of consideration in the committee and discussion on the floor of the Senate, it is scarcely necessary or useful to consider them in detail now. But it is not too early to call attention to the fact that section 105 to 140 inclusive of the bill as introduced enact for the Philippine Islands the whole of the obscure complicated, self-contradictory, inherently vicious and mischievous system now imposed by United States statutes upon a few unfortunate States and Territories, while the rest of our country is exempted from its burdens and evils by special acts of Congress, or in consequence of historical events. I refer to the so-called "Law of the Apex," with its grotesque appendix of the "extra-lateral right."

The State of Wisconsin, a representative of which introduced this bill, has never been cursed with the "extra-lateral" mining right. Its citizens, like those of every other State east of the Missouri, have always had their mining, like their agricultural, rights bounded by vertical planes through the surface boundaries of their claims. The original thirteen States of the Union, the new States afterward carved out of their territory, and the State of Texas, which never contained any United States public lands, are all free from this peculiar freak of legislation. So, likewise, are several States which have been released by special acts. And in all this aggregate area, which yields to-day the immensely greater part, in weight and in value, of the mineral product of the United States, mining law suits, *i. e.*, conflicts concerning the title to mining rights or mineral lands, which are governed by peculiar principles or rules, —unlike those which apply to other real estate and its appurtenant easements—are, and have always been, utterly unknown. More than that, in the whole civilized world, outside of our Pacific Coast, such conflicts are similarly unknown—with the solitary exception, so far as I know, of the Province of British Columbia, which once adopted the United States apex law, abandoned it in intelligent disgust after a few years' trial, and is now suffering occasionally from mining litigation, due to the "vested interests" acquired during that interval of thoughtless folly.

On the other hand, our Pacific States and Territories, few in number, but large in area, are still witnessing the annual expenditure by citizens and corporations engaged in mining within their borders, of millions of dollars, simply for the purpose of ascertaining what it was which they received from the Government of the United States, the sovereign and also the individual owner of the public domain, when they bought and paid for its mineral land, at so much per acre, and received its professed grant thereto. Is it any wonder that capital, both American and foreign, is now relatively neglecting these regions and pouring into Mexico, where one knows at least what one gets, by the solemn grant of the Republic?

If we inquire how this evil system was fastened upon a part of our country, and why it is that its incubus cannot be lifted, so that our great rich empire of the far West may be able to compete on equal terms with the rest of the world (including not only those countries which never felt this peculiar disadvantage, but also those, like Germany and British Columbia, which have borne it for a time, and cast it off forever), we find that it originated on our Pacific coast, not by any historic or logical succession whatever, but as the simple result of temporary local conditions. When we acquired California from Mexico, the Mexican law, prevailing up to that time, neither knew, nor had ever known, the "extra-lateral" mining right. Nor was that right, at that time, either cardinal or fundamental in any mining code of the world. In certain parts of Germany there were mining rights, few in number, and of ancient origin, which possessed this feature in some degree, and more or less qualified by governmental supervision; but there is not the slightest evidence that these instances were even known to the miners of the Pacific coast. The true explanation of the origin of our "extra-lateral right" is this:

1. The immense crowd of adventurous pioneers which rushed into California upon the news of Marshall's discovery of gold, found, overran and populated a region, mostly owned, but very imperfectly ruled, by the United States federal government. There were no public surveys, no available statutes, courts or public officials. The new communities, in rough but effective and admirable fashion, made and executed their own laws. Apart from horses, cabins, money, gold-dust, mining tools and supplies, and food, the only properties of recognized value were gulch-mining claims, and these were measured, simply but sufficiently, by a single longitudinal measurement; so many feet long the axis of the gold-bearing gulch to its discoverer, half as many to each subsequent locator. Upon each of these claims thus assigned, the owner might work as far into either bank or into the bottom of the stream-channel as the gold-deposit extended.

2. When the outcrops of the gold-bearing quartz-veins, which had conferred auriferous values to the gulches, were discovered and appropriated, the same rude system of defining the rights of miners was naturally followed. So many feet horizontally along the vein to the discoverer; half as many to each subsequent locator, and no limitation in other directions, except the termination of the deposit.

3. This rough-and-ready determination of mining rights continued until 1866; and during all this period of 18 years, the miners were, in law and in fact, trespassers upon the public domain. This principle, in fact, had been laid down by the United State Supreme Court, in the famous "Illinois lead case" (3d Howard, 120) long antedating the discovery of gold in California, and dealing with lead-mining on the public land in Illinois. But no attempt was ever made to enforce it upon the Pacific Coast; and the act of 1866 recognized and legalized the local customs and possessing titles of the miners upon the public lands of that region. In this way, the extra-lateral right gained a legal foothold. The later Act of 1872 (practically the present law) remedied some of the defects of its predecessor, and aggravated others, while it introduced a new set of difficulties peculiar to its own provisions.

So much for the origin of this anomalous and pestilent legislative freak. Much more could be said; but the foregoing is enough for any present purpose. The reason of the failure of successive attempts to rescue from its baneful effects the few States and Territories now afflicted with it seems to have been partly the complication of each proposed substitute by other features of reform, which did not command the unanimous support of those who might have consented to the single, great necessary change. An instance of this kind is furnished by the report of the "Public Land Commission" of 1880—an exceedingly able document, constituting a large octavo volume, and containing the complete draft of a new mining code—which fell perfectly dead upon Congress, and resulted in no legislation whatever. But no doubt the chief cause of such lack of remedial legislation, then and since, has been the traditions, prejudices and large vested interests of the inhabitants of those mining districts which have now been for thirty-six years under the law, and, for eighteen years before that, under the general principle, of the extra-lateral right. We must admit that it is a matter of no small difficulty and delicacy to change a system so deeply-rooted and so long established. Personally I think this ought to be done; yet, on the whole, I cannot wonder that it has not been done.

But all this historical review emphasizes the monstrous folly of imposing upon a region and a population which never knew it or needed it, and which possess already a different and better mining law, the embarrassment, injustice and trouble into which we fell (as to the smaller part of our mining industry) by accident and temporary supposed necessity, and in which we have stuck ever since, because of local prejudice and Congressional inertia. Is not our own experience sufficiently conclusive? Must we inflict mining experts and lawyers, with geological theories, maps, models, microscopic slides, and chemical formulas, upon the mining industry of the Philippines? Cannot we let the mining there get along as miners do everywhere else in the world, with one lamentable and monumental exception? Need we force upon them, out of all existing systems of mining title, the one which is conspicuously the worst?

Finally, and perhaps the most important of all: the civil code for the Philippines must necessarily be more or less tentative and experimental. For that reason, if for no other, it ought not to contain, as to mining titles, a feature which, once grafted upon a community, is so difficult to change as our own national experience has shown this particular one to be. In ordinary prudence we might at least let the Philippine miners have the system generally used by mankind, until they cry out for the exceptional arrangement apparently favored by a few States of our Union, and certainly rejected by all the rest.

R. W. RAYMOND.

BITUMEN IN CUBA.*

By T. Wayland Vaughan.

The data included in the following account of occurrences of bitumen in Cuba were obtained partly during a geological reconnoisance made at the request of the Military Governor under the direction of Dr. C. Willard Hayes, of the United States Geological Survey, and partly from existing literature. Dr. Hayes and the writer examined together the prospect pits northwest of Matanzas, and the occurrences in the vicinity of Hato Nuevo, 30 miles east of Cárdenas. The writer visited the mine at Loma Cruz, 9 miles north of Santa Clara City, and the Motembo naphtha well in western Santa Clara Province. Mr. Wm. Palmer, of the United States National Museum, has furnished data concerning asphalt in the vicinity of Mariel; Mr. M. J. Martinez, of Habana, has given information for the district of Puerto Parde, Province of Santiago, and Mr. Chas. T. Wiebusch, of New York, has furnished notes on the Mina Angela Elmira, of the West Indies Company, near Bijucol, Province of Habana. Quotations and resumés of the literature are freely made, as it was desired to make the treatment of the subject as complete as possible.

ASPHALT AND MINERAL TAR.

The occurrence of mineral pitch or asphalt† in the Island of Cuba has been known since the time of the Conquest. In the "General History of the Antilles," by Oviedo, published in 1535, mention is made of a spring of pitch near the coast in the Province of Puerto Principe. This material was used with an admixture of grease for painting the hulls of vessels. The same author mentions the occurrence of pitch upon the shores of Habana Bay, where it was also used for a similar purpose. The presence of this mineral was noted by Humboldt, who visited the islands in 1803, and it was mentioned both in the personal narrative of his voyage and in his essay upon the Island of Cuba. It is probable that Humboldt visited some of the localities which have since become prominent as asphalt mines in the vicinity of Habana. He reports that it occurs in the serpentine rocks in the form of fissure veins. He observed also some fluid bituminous material of the nature of petroleum running out of fissures in the same rock. In 1828 La Sagra, published in *Anales de Ciencias, Agricultra, Comercio y Artes*, a journal formerly printed in Habana, a somewhat extended account of the occurrence of asphalt in the vicinity of Habana, and although this article has not come into our hands the general report comprised in the great work of La Sagra upon the natural history of the island shows that the wide distribution of bituminous materials was well known at the time its author was in Cuba. Reference has also been found to a memoir on the bituminous deposits by one Navarro, published in 1829, and another by Moisant, in 1857, entitled *"Memoria sobre los Productos Bitumenosos de la Isla de Cuba."* Neither of these papers, however, has come into our hands. Previous to 1837, the asphalt mines in the vicinity of Habana were visited by the geologist, R. C. Taylor, and the results of his studies were published in two papers in which the material is described as bituminous coal.‡ Later, however, in speaking of the same localities in his "Statistics of Coal," published in 1848, this author indicates that the mineral is not coal, since it occurs in a true fissure, not lying within the stratification of sedimentary rocks.

Since the publication of these notes bitumen ranging in character from the solid form of glance pitch to that of mineral tar has been found in every province of the island. In the following account we have given not only our own observations but have compiled such information as could be gleaned from a somewhat extensive literature. In the following discussion the deposits are treated by provinces, beginning at the west with Pinar del Rio.

Province of Pinar del Rio.—The most westerly locality known to us is that of Santa Helena, at Bahia Honda, which district is said to contain unworked deposits of asphaltum of great brilliancy and purity. Asphaltum is also reported to be abundant in the Vuelta Abajo.

The next more easterly localities are in the general vicinity of Mariel. Salterain gives the following description of these occurrences.*

"The mines in the same province (Pinar del Rio), entitled Rodas Concepcion and Magdalena, belonging to Don Ramón Balsinde, as well as the sugar plantations, Cañas and Tomasita, on which these are located, at the head of the extensive Bay of Mariel. These are mines worked under the open sky, upon masses of asphalt, notable for their dimensions, especially the mine Magdalena of their plantation Tomasita, which measures, in the part already laid bare by the works, 12 meters of thickness, and more than 100 in length. This mass lies in the direction of west-southwest to east-northeast, and is probably a continuation of the other two mines situated on the neighboring plantation of Cañas.

"The quantity of mineral obtained in these mines consumed on the same estate of Señor Balsinde, as amounts to 1,000 to 1,300 tons a year, which is partly fuel, and in the production of gas for lighting purposes."

Mr. Wm. Palmer says that on the rough exposed surface of the reef at Mariel there are patches of asphaltum from 1 inch to 6 or 8 inches in diameter, and rarely more than ½ inch thick. They occur always in the higher portion of the rock between cavities and appear to have been drawn out by the heat of the sun.

One mile south of Mariel Bay is a deposit of asphaltum which has been quarried to a depth of about 50 feet. Several wagon loads were taken to the barracks of Guanajay. It is barely possible that this locality corresponds to one of the two mines above described. Mr. Palmer states that there are other occurrences of asphalt eight or ten miles to the southwest. The specimen brought by Mr. Palmer is a brownish, impure solid asphalt.

Near the town of Banes, between Mariel and Habana, are two other mines known as San José and Constancia, which are the property of Mr. Henry L. Crawford. These mines have never been worked extensively, and according to Salterain the production scarcely reached 400 tons during the two years preceding 1883.

Province of Habana.—Several asphalt mines were formerly operated in this province. R. C. Taylor made a study of some of these mines and published articles, already refererd to, upon them. Subsequently Consul Salterain, in his reports to the State Department, described other mines. As the information contained in these reports will probably be of value to those seeking information on Cuban asphalts we give a resumé of the descriptions contained therein.

R. C. Taylor in his "Statistics of Coal,"* describes several mines of solidified asphalt in the vicinity of Habana. The first mine mentioned by him is called the Casualidad, situated 6 miles from the town of Guanabacoa, 9 miles east of Habana and 2 miles south of the sea. The asphalt occurs in areas of serpentines, diorities and euphotides, accompanied by veins of quartz and chalcedony and often of copper. The material occurs in wedge-shaped veins which enlarge downward in breadth to a thickness of several feet. The bitumen seemed to occupy fissures and cavities in the ancient rocks. The outcrop was easily traced about 600 to 900 feet, but no attempt was made to prove greater extension. At the surface it was scarcely a foot thick, but at the depth of 30 feet it has a thickness of 9 feet. At the time Taylor visited this mine it was worked in an extremely crude manner, all the water as well as the materials, being hoisted by hand in small vessels and carried away by gangs of negroes.

MINA HAMEL, CUBA.

An analysis was made by T. G. Clemson; the result is as follows: Carbon, 34.97; volatile matter, 63.00; ashes or cinder, 2.03; total, 100.00. Specific gravity, in three different specimens, 1,142—1.189—1.197. Streak, dark, powder brown.

Taylor adds: "Externally it is of a deep jet-black; having the horizontal surface of the laminae covered with curious conchoidal markings, like the impress of a seal upon black wax. These impressions are marked with concentric, or rather with eccentric rings, not unlike the lines of growth on the flat valves or upper shells of some bivalves. They vary greatly in diameter from only half an inch to a foot.

"A considerable quantity of this coal or asphalt we found excavated and stored; some of which had been employed by the smiths and workers of iron in Habana. From various causes, we understand that

*Published by permission of Brig.-Gen. Leonard Wood, Military Governor of Cuba.

†We follow the definition given by F. V. Greene in his "Asphalt and its Uses," as we can see no logical basis for the one given by Malo. American Institute Mining Engineers. *Transactions*, Volume VII, pages 355-373. 1889.

‡Notice of a vein of bituminous coal in the vicinity of Havana, in the Island of Cuba. London and Edinburgh *Philosophical Magazine and Journal of Science* (3). Volume X, 1837, pages 161-167.

Notice of a vein of bituminous coal, recently explored, near Havana, Cuba. *Transactions*. American Philosophical Society New Series, 1839. Volume VI, pages 191-197. Plate.

*United States Consular Reports, Volume X, No. 31, 1883, page 76.

*Pages 243-247. 1848.

the mine has been prosecuted very feebly, and latterly has not been in operation; nor do the proprietors appear to have a ready market for the material."

A second old mine known as the Prosperidad, 6 miles from Habana on the road to Taposte, was described in the *Diaria de la Habana* during the year 1842 by M. Castales. Taylor has reprinted this article in the work by him already cited. The material has been developed to a considerable extent, two shafts having been sunk 135 feet apart. In the principal one of these the bitumen, or chapapote as it is locally called, was reached at a depth of 21 feet and continued to a depth of 120 feet, the bottom of the shaft. From the four sides of this shaft four straight exploratory galleries, 90 feet in length, have been driven in opposite directions; in all of which space the bitumen continues horizontally, and without any interruption. At the bottom of the shaft, or

MALTHA SPRING NEAR MINA HAMEL, CUBA.

at the depth of 120 feet, instead of sinking further in the chapapote, a perpendicular boring of about 39 feet, always in asphalt, was made. The above explorations showed a body of solid bitumen 144 feet in depth, and more than 180 feet in horizontal extent.

Salterain furnishes the following notes regarding asphalt mines in this province: "In the Province of Habana are the mines,* Santa Teresa, Jesus del Potosi, and Santa Rosa. The first is situated in the town of Las Minas, near the Bahia Railroad. It was worked by a company until 1862 by means of wells and galleries to the depth of 86 meters. Its bed consisted of a vein of excellent mineral in the serpentine formation, but whether it became exhausted, or whether proper search was not made, or from some other cause, the mine has been completely abandoned.

"Those called Jesus del Potosi and Santa Rosa, the property of Messrs. Glynn & Gomez, border on and are located in a place called Las Chumbas, 1½ miles south of the station of Campo Florido, on the above-mentioned railroad and on the shores of the river Bacuranao.

"The mass or masses of asphalt taken from them are placed between the Cretacean marl and the serpentine rocks which are found on the north, their direction being from southeast to northwest, with an approximate width of 5 to 6 meters, and extremely deep. This asphalt in quite impure, owing to the earthy matter which it contains; but, on the other hand, to the mixture of the said earthy substance is owing, without doubt, its more advantageous applications as combustible in grates and retorts for the elaboration of gas, as is shown by various experiments made for the purpose, as also for street pavements, etc.

"The slight nature of the preparatory works hitherto established, and the necessity for others which, though not properly belonging to the mines, were indispensable to their proper working, account for the fact that no more than 500 to 700 tons have been extracted during the present year; but it is safe to say that a bed, at once abundant and easily worked, exists; besides which, one of the most indispensable conditions for cheap transportation is assumed, namely, its proximity to the railroad station of Campo Florido, distant some 15 miles from Habana."

Viscous asphalt was seen exuding along the joint planes in the syenite rock being quarried about 1½ miles southeast of Campo Florido, when that locality was visited during this reconnaisance.

At present there is one asphalt mine being operated in the Province of Habana. The mine known as Angela Elmira is located about 5 miles from the town of Bejucal, and is owned by the West Indies Company, whose offices are in New York and of which Mr. Charles F. Wiebusch is treasurer. Work was begun in December, 1900, and the first shipment to the United States was made in January, 1901, since which time there have been regular shipments, the entire output being distributed in the United States. This was an old mine operated previous to the last war of insurrection. According to report, it was closed down by the Spanish authorities, and after the establishment of peace the property was procured by the present owners and work was resumed.

The material occurs as a body of very considerable size in limestone. It is hard asphalt, with from 70 to 72 per cent of bitumen, which is composed in about equal parts of so-called asphaltene and petrolene. The above data and the following analysis were furnished us by Mr. Wiebusch:

Analysis of Asphalt from Mina Angela Elmira.

By Dr. L. Saarbach.

In 100 parts.

Moisture and volatile at 60° C.	2.4
Petrolene	34.6
Asphaltene	38.1
Non-bituminous organic matter	5.4
Silica	10.2
Oxides of iron and aluminum	4.9
Lime	1.7
Magnesia	0.2
Sulphur in mineral combination	2.4
Alkalies and undetermined	0.1

Province of Matanzas.—Nine or ten miles northwest of Matanzas (about 1 mile east of north of the property known as El Recreo, now owned by Captain L. H. Mattair, U. S. A.) there is an occurrence of asphalt on the north side of a hill. The asphalt oozes out in liquid form and impregnates the surface sands and gravel, cementing them into a kind of puddingstone. It also accumulates in small quantities in ditches which have been dug here for the purpose of testing the yield. There is no great amount of the asphalt escaping to the surface, although the yield might be materially increased by sinking a shaft on the fissure. It exudes apparently from small fissures in the serpentine near its contact with a hard blue limestone, the serpentine forming the hill above and the limestone lying on its lower flank. The latter rock has no perceptible order of asphalt or petroleum, and therefore probably has no association with the origin of the bituminous material.

Another reported occurrence of asphalt is in the vicinity of Guamacaro between the towns of Limonar and Cárdenas. This locality was not visited nor have we been able to obtain any descriptions of the occurrences.

J. L. Hance* has published a rather detailed account of the asphalt deposits in Cardenas Bay and the following extracts are here reproduced.

"The asphalt deposits in this consular district (Cárdenas, Cuba) are nearly all sub-marine and situated in the bay of Cárdenas. It is not known that any scientific examination into their source has been made.

"As regards inland deposits, I am informed by a gentleman residing here, whose character is perfectly truthworthy, that he has discovered one within 15 miles of a railroad station, with good facilities for the construction and operation of a road and for the delivery of the product at a shipping port. This deposit is capable of yielding from 1,000 to 5,000 tons annually at slight expense and for many years, owing to the replenishment which is continually in progress. This deposit produces also an oil which has been burned in common kerosene oil lamps with good results.

"The deposits in the bay from which asphalt has been taken are four in number and of two grades. No. 1 is in the western part of the bay, and produces a very fine grade of practically pure asphalt, used in the United States for the manufacture of varnish. I have myself seen a serviceable varnish made by the simple process of dissolving this quality of asphalt in turpentine. Asphalt has been taken from this deposit in large quantities for the last 21 years. Recently, however, the work has not made rapid progress, owing to the frequent caving in of the sides of the shaft. The mode of operation is almost primitive. A lighter is moored over the shaft, which is from 80 to 125 feet in depth —varying according to the rapidity with which the asphalt is removed and replenished. A long iron bar, with a pointed end, is raised by a winch on board the lighter and allowed to fall so that its own weight detaches portions of the asphalt, which is about as friable as cannel coal, and has much of its appearance. The gloss, however, is more brilliant. After a sufficient quantity has been detached, a common scoop net is sent down and filled by a diver—not in a diving suit. The average quantity obtained is from 1 ton to 1½ tons daily. The price for this grade, delivered in New York, ranges from $80 to $125 per ton of 2,240 pounds.

*United States Consular Reports, Volume X, 1883, page 76.

*Consular Reports Vol. XLVII, No. 172, Jan. 1895, pages 126-128.

"The other three mines are of a lower grade, the product being used chiefly for paving purposes, but occasionally for roofing materials. No. 2 is northeast of Cay Coupe. No work has been done there since the hurricane of 1888, which caused the shaft to be filled up with silt. Previous to that time several cargoes were taken from the deposit. Nos. 3 and 4 contain asphalt of the same grade as No. 2, and adapted for the same purposes. No. 3 is situated at the mouth of the River La Palma, about 20 miles from Cárdenas. It is in the same condition as No. 2. No. 4 is situated near Diana Cay, 15 miles from the city of Cárdenas and is the largest of all. It is called the Constancia Mine and is owned by persons residing at Cárdenas. It has been under operation for more than 20 years. Probably 20,000 tons have been taken from it, and it appears practically to be inexhaustible. Vessels of from 150 to 200 tons have been moored over the deposit, and have been loaded by the joint labor of their own crews and the crew of the lighter usually engaged in this labor. The depth of water is about 12 feet. As there are several wells of no considerable depth, the facilities for procuring the asphalt are abundant. The deposit is inclosed within a circumference of about 150 feet, and the asphalt seems to be continually renewed in every part of this space. In 1882, an American vessel took on board, in the manner I have just described, over 300 tons in the space of three weeks.

"That the deposit of asphalt in the bay can be profitably worked as at present with methods seriously lacking in economy, suggests very strongly that considerable profit can be derived from the introduction of efficient machinery; the advantage would undoubtedly be increased in the case of easily accessible mines in the interior."

Near what was formerly the town of Sabanillo de la Palma, about 30 miles east of Cárdenas and some 4 or 5 miles west of Hato Nuevo, on the north side of the railroad, is the well of J. B. Hamel. This well is sunk to a depth of about 80 feet in serpentine rock and into it oozes a thick mineral tar. The material is drawn out by hand power, bucket and windlass being used. The output is about 20 barrels per day. In the vicinity of this well are two others, one about 300 feet further east, and the other about 600 feet to the west. The mode of occurrence of the material is the same. No area of limestone was discovered associated with the asphalt, but fragments were struck in the well. About a mile southwest of Mina Hamel and about 300 feet north of the railroad, is another area of natural tar wells or springs; one well is said to be 60 feet deep. Maltha has exuded from it over a considerable portion of the immediately surrounding surface. (See Fig. 2.)

This area of mineral tar occurs within a shallow topographic basin. There are hills occurring on both the north and south sides rising to 75 or 100 feet above the included depression. The elevation at Mina Hamel is probably not more than 25 or 30 feet. One hole in this vicinity according to H. E. Peckham,* was fired during the last insurrection and burned for four months until a heavy rain finally put it out. At present the ground for 70 or 80 feet around this hole is covered with coke. The well itself is full of rain-water, and upon which float masses of vegetation stuck together with bitumen that comes from below. A pole pushed down into the water 8 or 9 feet meets resistance in a soft yielding material, and if this can be brought to the surface it will be seen to be the same as that in the neighborhood. Peckham, in his article referred to, mentions several other localities. One is a tar hole near Santa Catalina plantation, some 5 kilometers north of east from Recreo. He refers also to a locality north of the hill on the north side of Mina Hamel, on the Victoria plantation.

It is reported that in the same province at scarcely a kilometer from the northern coast, there exists a deposit of bituminous shale impregnated with asphaltum of a high degree of purity and in great abundance, whose workings, though favored by facilities of transportation, have also been abandoned.

Province of Santa Clara.—Asphalt is reported from a number of localities in this Province. A considerable proportion of the data here included are taken from letters to Hon. Adam Badeau, Consul General at Habana in the years 1882 and 1883.* The most northwesterly locality in the province is about 15 miles northwest of Santa Clara in the direction of Sagua la Grande, near a plantation known as Indio. We have no precise data concerning the mode of occurrence or nature of this material, but we know that it is more or less liquid; whether it is a maltha or one of the more liquid petroleums is not stated.

About 9 miles northeast of Santa Clara, near Loma Cruz, is a mine of asphalt, known as Santa Eloisa, whch is being worked at present. The deposit fills a cavity in serpentine rock and has been penetrated to a depth of about 20 meters; it is about 40 meters wide and the length is not known. The material is a hard glance pitch and is used in the city of Santa Clara in the manufacture of gas. We are informed that some of the material is shipped but its destination was not given. The material is easy to mine. No timbering is needed, the roof is firm and pillars of asphalt which are left are all the support that is necessary. This mine is said to be owned by Juan Eulasia. The following analysis was made by Mr. Frederic P. Dewey. It is unfortunate that it was not expressed in terms of petrolene and asphaltene instead of being given as volatile matter and fixed carbon. Probably the volatile matter can be reckoned as being mostly petrolene and the fixed carbon will all belong to what is known as asphaltene.

Analysis of Asphalt from Mina Santa Eloisa, Cuba.

	Per cent.
Moisture	1.28
Volatile matter	45.43
Fixed carbon	31.75
Ash	21.54
Total	100.00

There are several deposits of more or less liquid bitumen in the vicinity of Camajuani, about 18 miles from Santa Clara in the direction of the San Juan de los Remedios. Another deposit of solid asphaltum three miles from Ranchuelo and 36 feet from the Sagua River, belongs to Diego G. Abren. No specific information concerning this occurrence has been obtained. Two undeveloped asphalt mines are reported to be on the sugar plantation of San Antonio, owned by a man named Flagué and located about 30 miles from the town of Sagua la Grande, a railroad running through the place. Another occurrence of asphalt is reported east of Sancti Spiritus near the boundary between Santa Clara and the Province of Puerto Principe.

Province of Puerto Principe.—In the introductory remarks on asphaltum and mineral tar it is stated that deposits of this material in the Province of Puerto Principe have been known for many years, but we possess no specific data concerning them. Mr. José G. Fuentes in a letter addressed to Hon. Ramón O. Williams,† makes the following notes, furnished him by Mr. José Martinez.

"In Jatibonico there are four asphaltum mines, located on both sides of the River Jatibonico, in the jurisdiction of Puerto Principe (Morón) and Sto. Esperitu; but they are not known in either province, because the little that has been extracted from them has been exported through Caibarien. They are close to the jurisdiction of Remedios, toward Mayajigua. On one side of the river there is a bed of asphaltum, in the jurisdiction of Morón, and another in the same river; and toward the other side of the river, in the jurisdiction of Sto. Espiritu, there are two others; these have never been worked, and have, indeed, only lately been opened.

"One of the beds, the one in Morón, is liquid and can be easily ignited. It is known by the name of Mal Nombre. The one that offers most advantages from its abundance and quality is the one in the river; it has a beautiful color.

"The one in Morón is situated on the estate of Encarnación-Leyba; the one in the river on the property of Mrs. Rita Marin; and of the two in Sto. Espiritu, one is on the estate of Mr. N. Legon, and the other on that of Mr. José Oropesa.

"The asphaltum was taken out by means of picks and crowbars, for it was really never mined, being only worked on the surface. From the mines the asphaltum was conveyed on mules' backs as far as the road to Mayajigua, or rather to the hill of Los Angelos (3 miles) and from there in carts to Rosa Maria (6 miles), where there is a railroad named Sagua & El Estero Reál (4½ miles).

"The cost of the asphaltum, from the mines to El Estero, Reá, is $12 per ton, but it could be done for $10 if there was anybody who would work up the mines. From El Estero Reál to Caibarien or Cayo Francés the conveyance is done in lighters at $1.50. It is easier to go to Cayo Francés, as the winds are more favorable. The cost of working the mines is not known, neither the yearly yield, because as already stated, the work done has been merely a trial.

"From the mines to El Estero Reál on the coast it is 13½ miles, and from there to Cayo Francés or Cairbarien, 15 or 16 miles."

Province of Santiago.—The only data concerning asphalt in this province is that furnished us by Mr. M. J. Martinez, of Habana. There is a deposit of solid asphalt, a glance pitch, found near Puerto Padre. This locality may be reached by going 6 miles south from Puerto Padre, to Ingnnio San Manuel. From the latter place about 20 miles southwest to La Farola cross roads, thence south about ¼ mile, where the asphalt is seen outcropping along the left-hand side of the road. So far as we know no work has ever been done on this deposit.

GENERAL REMARKS ON THE MODE OF OCCURRENCE OF THE ASPHALT.

From the foregoing descriptions it is seen that all of the deposits of asphalt concerning which we have specific information occur as veins, pockets, or exuding in the form of springs, usually in serpentine rock, but occasionally in limestone. None of the material is now found in its original rock, it having come into its present position from elsewhere. It is not at present possible to state from what rock this material has been derived or to give the original place of its occurrence. It must have been derived from organic matter, which could have furnished the necessary ingredients for petroleum as it is now believed that asphalt and mineral tar are simply residual products from mineral oils.

Commercial Value of the Deposits.—The data which have here been presented show that the bituminous substances, asphalt and mineral tar, occur from place to place in every province of Cuba. In some localities there is promise of fairly large quantities. Much of the material can undoubtedly be used in the manufacture of varnish and for insulating purposes, but the practicability of its use for other purposes is at present a somewhat undecided question. Apparently in the glance pitch the proportion of asphaltene is too high, so the material does not possess sufficient cementing qualities to be of value for paving, roofing, or asphalt cement. Some of the material evidently possesses large amounts of petrolene, but whether it is in stable chemical combination must be determined. It is suggested that the glance pitches which contain large proportions of asphaltene might be mixed with maltha which contains a large proportion of petrolene. In undertaking any commercial handling of the Cuban asphalts and maltha there should first be a careful examination of the deposits to determine the quantity that probably can be procured. If it is proved that a property possesses a sufficient quantity of material, it should be chemically studied with great care to determine the precise uses to which it can be put. Therefore, although we consider these bituminous substances as offering an inviting field for the investment of capital, it is suggested that any company which contemplates making such an investment should proceed with the greatest care.

American Journal of Science, 4th Series, Volume XII, July, 1901, pages 37-38.

†United States *Consular Reports*, Volume X, 1883.

*United States *Consular Reports*, Volume X, 1883, pages 73-74.

PETROLEUM.

The existence of petroleum in Cuba has been known for many years. R. C. Taylor in his "Statistics of Coal" makes some general remarks on the occurrence of such substances in the island. He does not separate maltha from the more liquid mineral oils so we are not able to distinguish precisely what he meant.

The only occurrences of petroleum of which we have positive reports are in the provinces of Matanzas and Santa Clara. Salterain,* in his article on "Asphalt and Bituminous Oil in the Island of Cuba," states that there is a mine of bituminous oil in the district of Lagunillas, Province of Matanzas, three or four leagues southwest of Cárdenas. "This oil contains a great quantity of the bituminous element, and requires one or two classifications for the extraction of petroleum, the principal object proposed by the company refered to." This locality apparently is the one described by Peckham in his article on the bituminous deposits situated at the south and east of Cárdenas, Cuba.† Peckham states that several wells have beeen bored on the plantation formerly owned by a man named Alvarez and associates. It has been about 5 years since anything has been done here. While drilling a well some 78 feet deep, for water, a black thick oil was found which rendered the water unfit for drinking purposes. A second well was sunk somewhat further to the west. There was some oil in this well also but the water was potable and was used. Alvarez conceived the idea of drilling a well for mineral oil. An engineeer and the necessary machinery was secured and a well, No. 3, was drilled. A large hole was put down to a depth of about 25 feet, and a 2-in. pipe was driven down 500 feet, at which depth oil was obtained. From this well 100,000 gallons were pumped out but the well would yield no more. An unsuccessful attempt was made to drill this well deeper, in the hope of procuring more oil. An attempt was made to drill another well but this also proved a failure. Further plans were being made for additional drillings when the war between Spain and the Cuban insurgents broke out. The refineries of Alvarez were burned and nothing has been done since.

In the western portion of the Province of Santa Clara is a naphtha well known as Mina Motembo. Salterain‡ has given the history, which we copy below, of the borings made here.

"The discovery of deposits of naphtha oil in the mine called San Juan, situated in the province of Santa Clara, district of San José de los Ramos . . . is of great importance and worthy of special mention.

"For some time attention had been directed to the fact that at many points of this locality hydrocarbureted gas was escaping, and with the object of investigating the circumstances Don Manuel del Cueto obtained the requisite permission from the government general, and in the year 1880 established a boring. After several attempts, which were ineffectual because of his little experience in this class of operations, he discovered, August 18, 1881, at the depth of 95 meters, a deposit of naphtha oil of extraordinary purity, which yielded some 25 gallons daily. Its special characteristics are that it is colorless, transparent as the clearest water, easily inflammable, and leaves no sensible residue after its complete combustion; its density is 0.754, it boils at a temperature of 85°, and dissolves asphaltum and resinous matter, and, in fine, possesses the characteristics of a naphtha of the rarest and most exceptional limpidity and purity.

"In the hope of obtaining greater quantities of the oil the boring was continued, and at the depth of 748 meters another deposit of the same substance was discovered with a yield of 250 gallons daily.

"This yield, however, soon diminishing, it was determined to continue the boring; but the operation unfortunately had to be discontinued at the depth of 300 meters, and at a time when the escape of gas was greatest, on account of the breaking of the cable used for drawing up the oil, and up to the present time it has been impossible to extricate it.

"Such is the present condition of this interesting mine, but it is intended to make other borings at points where, owing to the analogous conditions, it is presumed that new deposits exist and where a favorable result is anticipated."

The locality in which these wells were bored was examined by the writer. The wells were bored in the bottom of a shallow topographic basin and penetrated rock which is largely of volcanic origin. A portion of a well core consisted very largely of obsidian and other volcanic material. In the hills surrounding this basin are massses of serpentine. At present the only use being made of the naphtha is for the household purposes of a family living near by. The naphtha is piped from one well to this house, and, as it is very volatile, it is used for furnishing artificial light and in cooking. The pressure is very slight. No gas or oil is emitted from the second well.

There is a reported occurrence of one of the light petroleums from a place some 3 or 4 miles west of Santa Clara. This place, a filled up well, at present only some three or four feet in depth, was visited. There was no evidence of the existence of petroleum at that place.

Dr. H. N. Stokes of the United States Geological Survey examined a petroleum from Santa Clara, and has published an elaborate analysis of it.* The following is extracted from this article:

"At Santa Clara, Cuba, there is a spring known as the Sandalwood Spring, from which issues with the water a certain amount of petroleum, which, from its peculiar odor, is called sandalina, or sandalwood oil, although it more closely resembles the odor of cedar. The oil is collected from the surface of the water, and used as illuminating oil and for other purposes without being refined. About two liters of this oil were sent to the laboratory of the United States Geological Survey by Mr. C. W. Cunningham, and its examination gave the results described below.

"The oil, which is about as viscous as strong sulphuric acid, is somewhat turbid from suspended water, but when dried over calcium chloride it is perfectly transparent, amber colored, and shows the merest trace of bluish-green fluorescence. Its odor, as above mentioned, is agreeable, and in no way suggestive of even refined American petroleums, but rather of cedar wood. The specific gravity at 33° is 0.901. . . . The results obtained may be thus summed up. Sandalina is characterized by its peculiar odor, suggesting cedar wood; by the almost total absence of bodies other than hydrocarbons and by the comparative absence of such of these as boil below 230° and above 330° C., these being 3.3 and 11.3 per cent, respectively. Paraffin wax is absent, and other paraffins, if present, are probably only in subordinate quantity. Unsaturated fatty hydrocarbons do not amount to more than 1 per cent.

"Naphthenes are present in large quantity, and probably make up the bulk of the oil. In this respect it is allied to the Russian petroleums. Naphthene or petroleum acids are formed and may be separated in notable quantity even in a rapidly conducted oxidation with chromic acid. The final products of oxidation are carbonic acid, acetic acid with traces of higher homologues, and water. Small quantities of acetone were obtained."

Besides these occurrences of petroleum vague rumors have come to us of the existence of similar oils in the Province of Santiago near the towns of Manzanillo and Guisa, but we have been unable to find confirmatory evidence of these reports, although the writer spent some time in studying the geology in that portion of Santiago Province.

*United States *Consular Reports*, Volume X, 1883, page 75.

†*American Journal of Science*, 4th Series, Volume XII, July, 1901, pages 36-37.

‡United States *Consular Reports* Volume X, 1883, page 75.

*Bulletin No. 76 of the United States Geological Survey, No. 78, Washington, 1891, pages 98-104.

IRON AND STEEL WORKS OF THE UNITED STATES.

BY JAMES M. SWANK.

*From preface to the fifteenth edition of the *Directory to the Iron and Steel Works of the United States and Canada;* published by the American Iron and Steel Association.

This preface describes so clearly and briefly the condition of our iron and steel works at the close of 1901, as compared with their position in 1898, that we take from it the following extracts:

Blast Furnaces.—In the edition of the *Directory* for 1898 we described 420 completed furnaces as being then active or as having been reported to us as likely to be some day active. We added, however, that we felt certain that about 50 of these furnaces would never make another ton of pig iron, thus reducing the number of furnaces that were then active or likely to become active to 370. We gave the annual capacity of these furnaces as amounting in round numbers to 18,000,000 gross tons, not all of which capacity could, of course, be employed at the same time. In the present edition we describe 406 completed furnaces, either active or reported to us as likely to be some day active. Eliminating some of the furnaces in the latter category as being in our opinion dead for all time, there remain less than 400 live furnaces to-day. But many of these are the largest that the world has ever seen. Their annual capacity we place in round numbers at 24,000,000 gross tons, an increase since 1898 of exactly 33 1-3 per cent. Our actual production of pig iron in 1901 was 15,878,354 gross tons. Since 1898 we have transferred 58 furnaces to the abandoned, dismantled, or inactive list.

When the *Directory* for 1898 appeared 4 furnaces were classified as follows: 79 used charcoal as fuel To-day we enumerate 12 furnaces as in course of erection, of which 2 are in New York, 1 is in New Jersey, 3 are in Pennsylvania, 1 is in West Virginia, 2 are in Alabama, 1 is in Michigan and 2 are in Colorado. In these figures for both years we do not include merely projected furnaces, or furnaces that had been undertaken and work upon which had been suspended.

The 420 furnaces described in the edition for 1898 were classified as follows: 79 used charcoal as fuel and 341 used anthracite and bituminous fuel. Of the 406 furnaces that are now described 55 are reported as using charcoal, 5 as using mixed charcoal and coke, and 346 as using anthracite and bituminous fuel. The decline in the number of charcoal furnaces will be noticed, but it is also worthy of notice that many of the charcoal furnaces that are still active are of large capacity. The annual production of charcoal pig iron is not decreasing, although it is decreasing relatively as compared with the production of pig iron with coke and other fuels. In 1900 Georgia and Tennessee produced 44,608 tons of pig iron with mixed charcoal and coke. This was a larger tonnage than the total production of pig iron in that year with anthracite alone, which amounted to 40,682 tons. In 1901 we produced 23,294 tons of pig iron with mixed charcoal and coke.

The average annual capacity of 79 charcoal furnaces in 1898 was 12,119 gross tons, and the average annual capacity of the 55 charcoal and 5 mixed charcoal and coke furnaces that are now described is 14,179 tons. The average annual capacity of the mineral fuel furnaces in 1898 was 53,150 tons, and the average annual capacity of these furnaces to-day is 69,252 tons.

Rolling Mills and Steel Works.—In the edition of the *Directory* for 1898 we enumerated 504 completed rolling mills and steel works and 4 in course of erection. In the present edition we enumerate 527 completed rolling mills and steel works, 28 in course of erection, and 1 being rebuilt, making a total of 556. In addition the *Directory* mentions 1 plant which is to be rebuilt and 6 plants that are projected.

Puddling Furnaces.—The number of puddling furnaces in April, 1898, each double furnace counting as two single furnaces, was 3,889. In November, 1901, there were 3,251 puddling furnaces. The highest number of puddling furnaces reported in any

edition of the *Directory* was in 1884, when 5,265 were mentioned.

Bessemer Blow," by W. N. Hartley and H. Ram- completed bessemer steel works in April, 1898, including 2 Clapp-Griffiths plants and 1 Robert bessemer plant, was 45, and the whole number of converters was 100. In November, 1901, there were 35 standard bessemer steel works with 81 converters, 1 Clapp-Griffiths plant with 1 converter, 2 Robert bessemer plants with 3 converters, and 9 Tropenas and special bessemer steel plants with 15 converters, total number of bessemer plants, 47; total number of converters, 100, the same number as in 1898. The increase in the number of small bessemer plants in the last few years is noteworthy. Since April, 1898, seven standard bessemer plants have been placed on the retired list, but the capacity of the remaining standard plants has been increased. The annual capacity of the completed bessemer converters in April, 1898, was 10,633,000 gross tons; in November, 1901, the capacity of the built and building converters was 12,998,700 tons.

Open Hearth Steel Works.—In the *Directory* for 1898 we described 99 completed open-hearth steel plants, with 281 completed furnaces, and in the present edition we describe 112 completed plants, with 403 completed furnaces. In 1898 no new plants were being built. In November, 1901, 12 open-hearth plants with 40 furnaces were building, 1 plant was to be rebuilt, 13 plants were projected and 6 furnaces were being added to existing plants. The annual capacity of the 403 completed and the 46 building open-hearth furnaces, in ingots and direct castings, in November, 1901, was 8,289,750 gross tons, against 3,522,250 tons of the completed furnaces in 1898.

Basic Steel.—In the *Directory* for 1898 we indicated the character of the product made at our open-hearth steel works, whether acid or basic steel, or both. Of the 99 completed open-hearth plants in April of that year 43 were prepared to make basic steel, and of 10 open-hearth plants that were projected at that time a majority would probably make basic steel. In the present *Directory* 167 open-hearth furnaces are described as making acid steel and 236 as making basic steel; total, 403 furnaces. The acid-furnaces have an annual capacity of 1,874,650 gross tons of ingots and castings and the basic furnaces of 6,415,100 tons.

Crucible Steel Works.—In November, 1901, there were 45 completed crucible steel plants, 3 building, and 1 plant projected. The number of pots in the completed plants was 2,896, and the aggregate annual capacity of these plants was 175,000 gross tons of ingots and castings.

Steel Castings.—In 1898 there were 47 open-hearth plants which were prepared to make steel castings, and in November, 1901, there were 56, but in the meantime the capacity of many of the old plants had been increased. The production of open-heart steel castings has greatly increased since 1898. As already mentioned, the number of small bessemer plants has also increased since 1898, all of which make steel castings. Steel castings are also made by 14 crucible plants.

Rail Mills.—In the edition of the *Directory* for 1898 we enumerated 51 rolling mills which were prepared to make standard, girder, light T, and other iron and steel rails. In the present edition we enumerate 45 completed rail mills and 3 building.

Structural Mills.—The whole number of works which are now equipped to manufacture all kinds of rolled structural material, including beams, beam girders, zee bars, tees, channels, angles, bridge rods, building rods, plates for bridge work, structural tubing, etc., is 67. This branch of the American iron trade, like the production of steel castings, has made marvelous progress since the appearance of our last edition. It has been a leading factor in the development of our open-hearth steel industry and in the enlargement of our bessemer steel industry beyond the production of rails.

Plate, Sheet and Skelp Mills.—In the present *Directory* we enumerate 223 completed plate, sheet and skelp mills, 13 building and 2 projected. In the edition for 1898 we enumerated 230 completed, 2 building, 1 partly built and 1 projected.

Tinplate and Terne Plate Works.—In April, 1898, there were 69 completed tinplate and terne plate works, 1 building and 1 projected. In the present *Directory* we enumerate 55 completed works, 7 building and 1 projected.

Cut Nail Works.—In April, 1898, there were 46 rolling mills which were devoted in whole or in part to the manufacture of cut nails and spikes, and in addition there were 9 nail factories which bought their nail plate, the whole number containing 4,544 nail and spike machines. In November, 1901, there were 43 works of all kinds which made cut nails and spikes, equipped with 3,385 nail and spike machines.

Wire Rods.—In 1898 we enumerated 24 completed wire-rod mills and 1 projected mill. In November, 1901, there were 32 completed wire-rod mills, 4 building, 1 rebuilding and 1 projected mill.

Wire Nail Works.—In the edition of the *Directory* for 1898 we enumerated 79 completed wire-nail works and 1 works building. In the present edition we enumerate 64 completed wire-nail works, 3 building, 1 rebuilding and 1 to be rebuilt.

Forges and Bloomaries. The number of pig and scrap iron bloomaries not connected with rolling mills in April, 1898, was 10, of which several were then idle. The number enumerated in the present *Directory* is 8, nearly all of which were active in 1901. The number of forges which make blooms directly from the ore is reduced to 2, one in New York and one in North Carolina. The latter is idle.

Natural Gas.—In the *Directory* for 1898 we enumerated 94 completed iron and steel works which used natural gas in whole or in part and 2 in course of erection, as follows: 41 in Allegheny County and 20 in other parts of Western Pennsylvania, with 1 building; 2 in West Virginia; 7 in Ohio, and 24 in Indiana, with 1 building; total 96. The total number of works which used natural gas in November, 1901, was 110, and in addition 7 works to use natural gas were being erected, as follows: 43 completed and 2 building in Allegheny County and 24 completed and 4 building in other parts of Western Pennsylvania; West Virginia, 7; completed and 1 building; Kentucky, 2; Ohio, 11; Indiana, 22, and Illinois, 1.

Canada.—Canada now has 14 completed blast furnaces, 4 building and 4 projected. The completed and building furnaces have an annual capacity of 958,000 gross tons of coke pig iron, 7,300 tons of charcoal and coke pig iron, and 125,000 tons of charcoal pig iron. The total annual capacity of all these furnaces is 1,090,300 gross tons. There are now in Canada 18 completed rolling mills and steel works and 2 building. Of the steel works 1 makes steel in a special bessemer converter, 1 makes Tropenas steel and 2 standard bessemer steel plants are being built; 4 make open-hearth steel, and 1 open-hearth steel plant is being built. The annual capacity in ingots and castings of the completed steel plants and of those in course of erection is as follows: Standard bessemer, Tropenas and special bessemer, 301,400 gross tons; open-hearth, 537,000 tons; total, 838,400 tons. The annual capacity of the rolling mills in rolled products of 981,900 tons. The *Directory* fully describes all these Canadian enterprises.

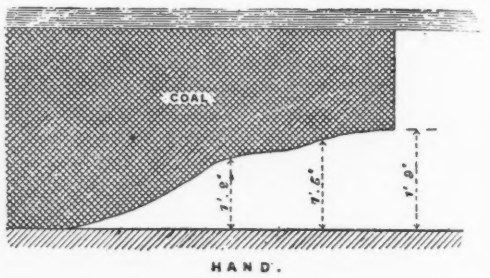
In June, 1898, Canada had only 8 completed blast furnaces, and 1 furnace was in course of erection. Only two or three of the completed furnaces could be called large furnaces. Since the date mentioned the Dominion Iron and Steel Company has built four large blast furnaces and a large steel plant at Sydney, Nova Scotia. Other new iron and steel enterprises have in the meantime been undertaken in Canada, some of which are now in operation and others are approaching completion.

The development of the Helen Mine at Michipicoten and the bounty on exported Canadian iron and steel have helped this growth.

COAL CUTTING BY MACHINERY IN BRITISH COLLIERIES.—I.

By SYDNEY F. WALKER.

Machines are employed in British collieries in longwall working, and the disk machine, of which many forms are on the market and the first of which was introduced about 30 years ago, is the one most frequently used. The necessity for machines to perform the work that is done by the miner in the ordinary way—the undercutting of the coal, so that the coal may fall, or be shot down—arose from the necessity for working the thinner seams of coal, after the thicker seams had been worked out, and the disk machine was rendered possible by the adoption of the longwall system of mining, which again was rendered necessary by the smaller thickness of the seams. The earlier system of working known variously as "bord and pillar," "pillar and stall," "stope and room," in which the coal was worked over twice, once in proceeding toward the boundary, and the second in

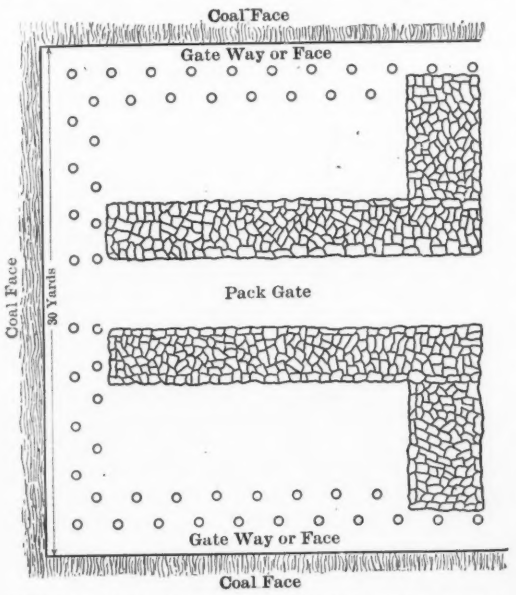


COAL CUT BY HAND AND MACHINE.

coming back from the boundary, is too expensive for thin seams such as are now being worked successfully—seams which run from 18 inches to 3 feet 6 inches in thickness. These seams are now almost universally worked, in British collieries, on the longwall system; the face moves continuously forward, and the face itself forming one continuous line, or a succession of steps in a zigzag line. With the smaller seams, those of 2 feet 6 inches and below, the cost of cutting is very high, especially in times of good trade. Further, the miner could not usually cut in the clay, or other substance which underlies the coal, and in mining in the coal itself, he made a large proportion of slack, which had a much lower value than the large coal. These two things, the higher working costs, and the lower value received, often rendered a particular mine unworkable commercially. With hand mining, a very much larger cut is made in the coal than with the machine, because the miner, in cutting in say 3 feet, or 3 feet 6 inches, has to follow his pick, and has to cut away sufficiently from the coal to allow his shoulders and arm to go into the cut in order that he may be able to handle the pick inside. With

machines, except the percussion machine, the hole cut is a parallel groove, only of sufficient width to allow the cutting tools to work freely, and to allow sufficient leverage for the weight of the coal above to bring it down. Another fact which led to the adoption of machines was the difficulty of getting men to come to work regularly in good times.

The disk machine grew out of the "iron man" as the miners called it, which consisted simply of the



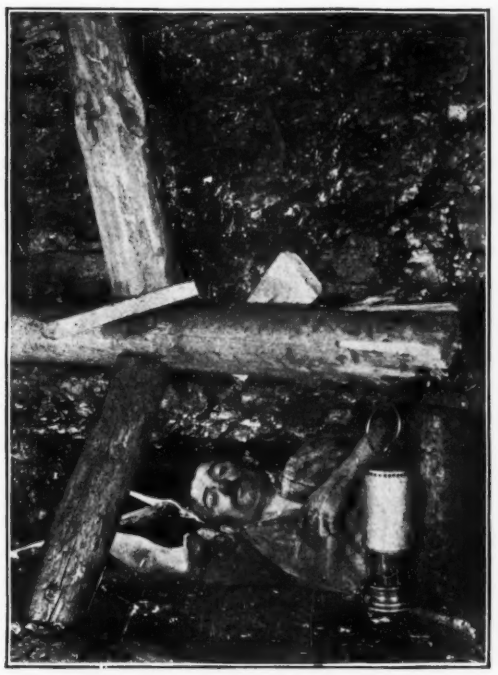
WORKING COAL CUTTING MACHINES WITH A BAD ROOF.

point of a pick, attached to the connecting rod of a single cylinder engine. In the disk machine, a number of pick points are arranged around the periphery of a disk, the disk itself being driven either by an engine worked by compressed air, or by an electric motor. An intermediate machine was the chain machine introduced by Messrs. Baird, of Glasgow, in which a chain, carried by a jib, supported a number of pick points, which were made to pass gradually under the coal, or into the base of the coal seam, cutting a parallel groove, as with the disk machine.

A bar machine is also used to a small extent for longwall mining. It consists of a tapered bar, on which a number of small picks are arranged in a spiral groove around the bar. The bar revolves, cutting a parellel groove similar to the disk machine. The bar machine has not found such favor as the disk machine for reasons that will be given.

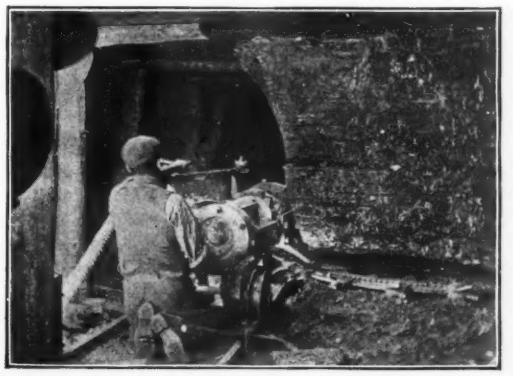
Machines are also employed to a considerable extent for driving headings. These are of three kinds, the chain breast machine, imported from America, the circular heading machine made by the Nuneaton Engineering Company and known as the Stanley heading machine and the percussion machine. The breast machine, as is well known in America, cuts a parallel groove the width of the front length of the chain, by means of the cutting tools, the pick points carried by the chain. A variation of this is the earlier machine, in which the cutting tools were carried by a bar which revolved horizontally, cutting a parallel groove of its own length. One of these bar heading machines is still at work in a large colliery in South Wales. The principal form of Stanley heading machines cuts out a groove annular in form, leaving a core in the center, which is got down by hand labor, assisted where necessary by blasting, the road cut being cylindrical in form. The percussion machine is well known in America.

The districts in which coal-cutting machines are at work principally are the west of Scotland, and the district in the Midlands comprising South and West Yorkshire, and North Derbyshire. They are also used to a smaller extent in Staffordshire, Lancashire, Durham, North Cumberland, very slightly in Cumberland, South Wales, Leicestershire and Worwickshire, and not at all in Somersetshire, or the Forest of Dean, the districts above all others in which they would be of the greatest advantage. Yorkshire and the west of Scotland may be called the go-ahead districts of the United Kingdom, so far as coal mining is concerned, and they have very much the same characteristics in the manner of carrying out their work. Usually, in both of these districts, the work done is of a very solid character. In the majority of cases there is no "spoiling the ship for a pennyworth of tar," so that if a machine is taken up, it is usually taken up properly. Northumberland, Durham, and Lancashire follow somewhat behind, but they also, particularly Durham and Northumberland, carry the thing out well if it is taken up at all. In some of the other districts, and with some firms even in the go-ahead districts, there is a tendency to hang back till some one else has obtained the experience, and also not to carry out the work thoroughly when it is taken in hand. Managers bitterly complain, in many instances, in every district, that where they ask for a certain sum to carry out some improvement, they are often made to do the work with half, or less. And this often follows after the apparatus has been at work for some time, when repairs and renewals are required. Another reason for the delay in making use of machines for undercutting the coal, and in fact for the delay in using



UNDERCUTTING COAL BY HAND.

nearly every class of new machine about a colliery, is the treatment meted out to the inventor and the pioneer, in British works, more particularly in collieries. In all cases, the manager resents almost any new thing which interferes with the regular course of his work and concentrates his efforts upon proving its uselessness. He cannot afford to have his output interfered with, and therefore unless the new invention will fall into its place without any trouble, and without interfering with his output, he does not want to be bothered with it. This applies particularly to coal-cutting machines. In British collieries, where machine mining is resorted to, the practice is to undercut the coal during the night, and to load the machined coal into trams during the day. If a machine is being tried for the first time, at a particular colliery, it is practically necessary for the manager to be at work day and night, while the trials are going on, and those trials often last for several weeks. It frequently takes that time for things to get into shape. Hence no manager is likely to be keen upon the adoption of coal-cutting machines unless he can see his way very clearly to improve the output, and lessen the running expenses of his colliery. In a great many of the collieries where coal-cutting machines have been of most value, those in which the seam is very thin indeed, say 18 inches, serious practical difficulties have naturally arisen in the application in the early days of the machine at any particular colliery. The men who would be sent with the machine, by the makers, were often not accustomed to the conditions ruling in the place where the machine is to work. It often happened that the 18 inches depth of the seam was also the height of the roadway in which the machine had to work, and in which men had to crawl in attendance upon it. The man who has been accustomed to working in an upright position, with plenty of room around him, and in the full light of day, feels uncomfortable, to say the least, in this position, and is likely to get out as quickly as possible upon the slightest excuse. This trouble also extends to the men who



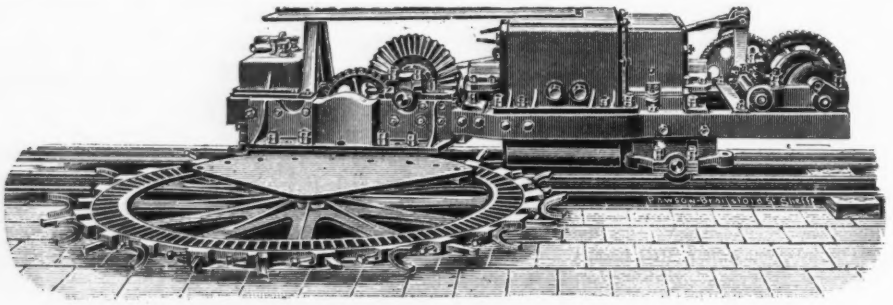
COMPRESSED AIR DIAMOND COAL CUTTER.

run the machines, after they are taken over by the colliery. The machine is working under the most trying conditions possible and there are constantly numerous little matters that go wrong, and stop the working of the machine. If the man running the machine is a practical mechanic, these little troubles are quickly remedied, and the machine is kept going fairly constantly. If it is run by a man who has not the necessary knowledge, stoppages are frequent, and the output of the machine is then less than that of a miner working by hand, under similar conditions, while the whole of the costs of running the machine have to be paid. But there are other equally important qualifications required of the man in charge of the coal-cutting machine. The man working at the face of the coal has his life more or less in his hands. Unless he is able to appreciate, and to act promptly upon the various warning signals given by the strata, warnings which the practical miner thoroughly understands, the machine itself may be constantly stopped in its work, and the lives of those in attendance upon it sacrificed. Experience has shown that the practical miner who will put his mind upon the subject, and will master the details of his own particular machine, makes the best attendant for coal-cutting machines. His work may not always be such as a mechanic would approve, and one can imagine the

ELECTRICALLY DRIVEN DIAMOND COAL CUTTER.

superior smile that the mechanic would give, on seeing some of the work of the miner, on a coal-cutting machine, but it has the practical advantage of keeping the machine at work, and that is everything. In one colliery in Yorkshire, one machine has been continuously employed at the face for 5 years. But the most serious cause of the delay in the introduction of coal-cutting machines in Brit-

ish collieries has been the action of the workmen. Unfortunately the British workman is possessed with the idea, in the great majority of cases, that he does his fellow workman a grievous wrong by working a machine, or by doing anything which facilitates the working of a machine that may displace a certain quantity of hand labor. It is estimated that each coal-cutting machine for longwall mining displaces from 10 to 20 miners, and

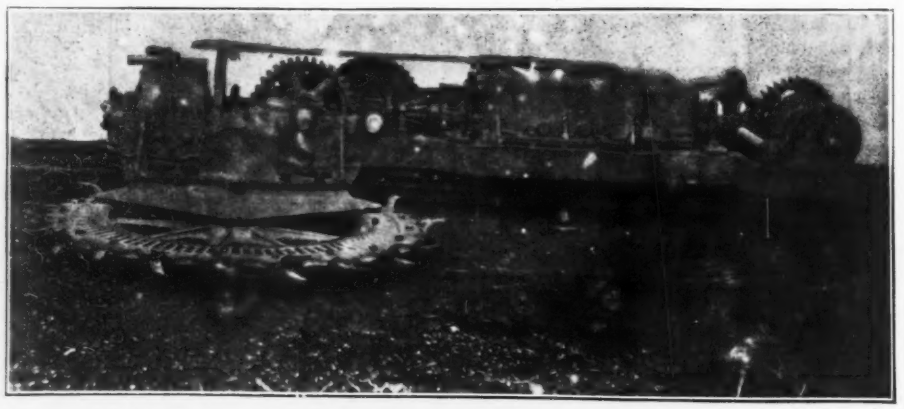


CLARK'S ELECTRICAL COAL CUTTER.

therefore in the eyes of the workmen who think on the above lines, its sin is great. Consequently, in nearly every case, strong efforts have been made, by the local unions, and by the workmen, to neutralize the advantage gained by the use of the machine. Fillers, the men who load the coal into the trams which carry it to the shaft bottom, in many cases have so increased the cost of loading machine-cut coal, that the total cost of bringing the coal to the surface was greater by machine than by hand. There are signs that in some of the districts, this state of things is passing away. The men who attend to the machine having found out that they earned a good deal more, and with less inconvenience than when cutting by hand. The number of men available who understand enough of the construction of the machine to keep it running is steadily increasing.

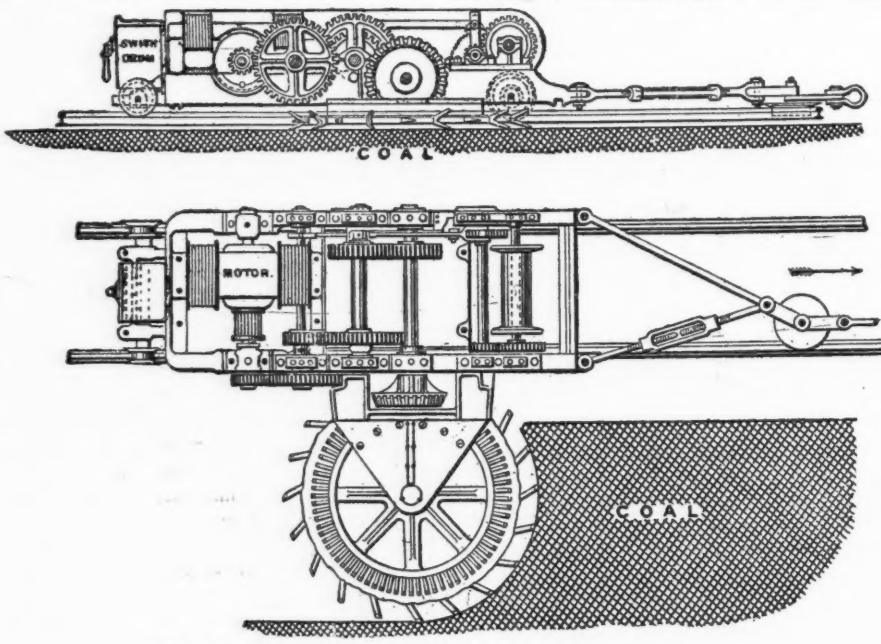
It is not only in thin seams that the longwall machines have been successfully adopted. They have also been used for mining under seams up to 4 feet 6 inches in thickness and by their use, blasting has in some cases been entirely done away with. Thus Mr. W. E. Garforth, of Normanton, Yorkshire, who has given great attention to the subject, and who has a trained staff of skilled mining men under him, who understand coal-cutting machines, has succeeded in under-cutting the coal in his colliery at Altofts, Yorkshire, to the depth of 7 feet, with the result that the coal comes down without blasting. The leverage provided by the weight of the coal, is sufficient to bring it down, if the seam is undercut in the right direction so that the weight of the overhanging piece of coal acts upon the natural cleavage.

Another difficulty in the way of adoption of the longwall machine is the matter of the roof and floor. In order that the machine shall run along the coal face, cutting as it runs, the floor must be fairly uniform, at whatever gradient the face is be-



LONGWALL DISK MACHINE.

ing worked, and the roof must be kept up till the machine has passed. In many mines both of these points present great difficulties. Where the roof is weak, that is to say, where the material of which it is composed does not possess sufficient cohesive force to hold together when exposed to the leverage offered by the length of roof between the face and the nearest support, it is constantly coming down, burying the machine and stopping the work. Where the floor upon which the machine runs is soft, or unequal, a similar trouble arises. The machine cannot be kept up to the face without considerable trouble, and has to stop to be re-set frequently. The roof trouble, it would appear from the experience of a colliery manager in Yorkville, is one that can be overcome by using proper appliances. The manager in question went to a colliery where they had been unable to use a coal-cutting machine, owing to the fact that it was constantly being buried, by falls of roof. He succeeded in keeping up the roof, and the machine, with others, has been doing good work ever since. His method consists simply in timbering in such a manner that the strain is taken off the intermediate line of the face. The overlying strata is thoroughly supported by lines of poles, at a proper distance from the line of the face. Occasionally, in particularly weak spots, he supports the roof by special props which are moved as the machine goes by. Another source of trouble very much accentuated in South Wales and Somersetshire, is the presence of faults, which necessitate the moving of the machine, usually a heavy one, up or down anywhere from 5 to 30 feet.



ELECTRICALLY DRIVEN LONGWALL DISK MACHINE.

The fact that the "bord and pillar" system is still in use in a very large number of collieries, in the United Kingdom, and the existence of the very thick seams of Staffordshire, militate against the use of machines under those conditions. With "bord and pillar" working heading machines of the Jeffrey type could be used for mining, but as the width of the road is often only 8 feet or less, it is necessary to "nick" the coal as it is termed, to cut a groove on one side of the road, or it is difficult to break down the coal without a good many shots, and then it is much broken up. No machine so far has been introduced which would mine and "nick" in succession as wanted. It is probable that some of the light pneumatic tools that are doing such good work elsewhere could be used for nicking. The general tendency is more and more to longwall working.

The saving of cost by the use of machine varies greatly. It consists of two items, the reduced cost of mining, and the reduced quantity of fine coal, leading to increased value. In one record case in Yorkshire, the combined saving amounted to 7s. per ton. A fair average seems to be 1s. a ton saved, and 1s. a ton increased value to the product.

All coal-cutting machines in use in British collieries are run either by compressed air, or electricity. In many cases, the same machine is adapted for the use with either method, but in the case of the percussion machine, only compressed air is employed. Though electricity presents many advantages, more machines are run by compressed air. Mine managers have greater confidence in it, though the cost for power is usually more with compressed air. It assists to ventilate the mine, and it presents no danger in fiery mines.

The quantities of coal cut by machines in the different districts in the United Kingdom are as follows for the year 1900: Yorkshire had 83 coal-cutting machines at work, which cut 1,046,941 tons out of a total of 28,243,597 tons. The Midland District, consisting principally of Nottinghamshire, Derbyshire, Leicestershire and Warwickshire, had 58 machines at work which cut 645,685 tons, out of a total of 28,933,041 tons. Lancashire, Cheshire and North Wales had 63 machines at work, and cut 586,800 tons out of nearly 29,000,000 tons. Scotland had 45 machines at work and cut 529,791 tons out of a total of a little over 33,000,000 tons. North-

umberland and Durham had 27 machines at work, and cut 342,500 tons out of about 48,000,000 tons. Staffordshire had 15 machines and cut 84,000 tons out of about 16,000,000 tons. South Wales had 5 machines, and cut 50,500 tons out of about 28,000,000 tons. The Southwestern District in which are included the Forest of Dean, Somerset and Monmouthshire, had 2 machines, which cut 10,000 tons out of nearly 14,000,000 tons.

RUTILE MINING IN VIRGINIA.*

By GEORGE P. MERRILL.

Much attention is being paid by metallurgists to the question of the influence of titanium on cast iron and steel, the concensus of opinion being, apparently, that such influence is beneficial; indeed, according to Mr. A. J. Rossi, in a paper read at the Milwaukee meeting of the American Society of Mechanical Engineers, May, 1901, cast iron may be improved in both transverse and tensile strength from 20 to 30 per cent by the addition of "small percentages" of titaniferous alloys. Quite similar results follow its use in steel.

These results, if borne out by future experiments, are certain to create a demand for titanium ores. Of such, in the form of ilmenite and titaniferous magnetites, there is an unlimited supply. In experimental work and, perhaps, in actual practice as well, it is, however, often desirable to deal with an ore of titanium practically free from iron and other impurities. Such compounds are common and widespread as minerals in the forms of the oxides rutile, brookite and octahedrite, though, so far as known to the writer, they have never until very recently been found in such quantities as to be looked upon as commercial sources of supply, should a demand arise.

The small amount of rutile that has thus far been put upon the market for other than mineral specimens has brought, according to the authority just quoted, from $350 to $450 a ton. In view of these facts, a brief description of a recently opened rutile deposit in Virginia may be of interest.

The deposit lies on both sides of the Tye River, near Roseland postoffice, in Nelson County, Virginia. The country rock is a strongly foliated gneiss, traversed occasionally by dikes of hypersthene diabase. The rutile occurs associated with a coarsely crystalline quartz-feldspar rock, the exact nature of which has not been made out, but which, from the size of the deposit and its crystalline nature, is judged to be eruptive. The full extent of the deposit has not yet been determined, but must comprise several hundred acres on both sides of the Tye River.

The ore occurs mainly in the form of small granules of all sizes up to two or three millimeters in diameter, which are sometimes disseminated with wonderful uniformity throughout the feldspathic ground-mass or again segregated in the quartz.

The petrographic character of the rock is very interesting. The most common type, as already stated, is a coarsely crystalline aggregate of potash and soda-lime feldspars of a very light gray, almost white, color, throughout which are disseminated the small rutiles like the phenocrysts of quartz in the Chalk Mountain, Colorado, Nevadite, as described by Dr. Whitman Cross. With this is associated a peculiar bluish opalescent quartz which, however, occurs under such conditions as to suggest that it is not a result of primary crystallization. Occasionally, as at the opening at present being worked, the quartz predominated over all other constituents, and masses of several tons weight are procured in which the rutile granules occur in quantities up to 25 per cent of the entire mass. The rock is remarkably free from other minerals than those mentioned, with the exception of microscopic enclosures of sericite resulting from the feldspathic alteration. There is a complete absence of titaniferous iron or other heavy minerals such as would render difficult a separation of the rutile by ordinary gravimetric methods.

The material has been mined from open sidehill cuts and the ore shipped to Charlotte for concentration, the company being now engaged in filling an order from a German firm for some 40 tons of concentrates.

A sufficient amount of exploitation has not yet been made to enable the character of the contacts or the exact boundaries of the deposit to be made out. In a general way, they can be ascertained by the color of the decomposition products, the country rock yielding a deep red clay, while the feldspathic gangue from the rutile deposit breaks down into a light grayish, more sandy, material.

Frequent prospect holes have been opened, and it is safe to say that enough ore is in sight to supply any demand likely to arise for a long period. Abundant water supply is furnished by the Tye River, and should the demand for the material continue to increase, there is every reason to look for the development of quite an important industry along lines heretofore untouched.

It may be well to state that the property is under the control of the American Rutile Company, incorporated under the laws of Virginia, with offices in the Pacific Building in Washington, D. C.

*Read before the Geological Society of Washington, February 12, 1902.

THE MINERAL WEALTH OF INDO-CHINA.

M. Marc Bel, a mining engineer, who has recently travelled over a large part of Indo-China on behalf of certain mining associations and of the Minister of Public Instruction, has communicated to the Society of Commercial Geography of Paris the result of his observations in regard to the mineral wealth of the country, as well as the prospects of mining enterprise there.

After summarizing the present mining law of Indo-China, which is much more liberal than that existing before 1897, M. Bel admits that its provisions have not given the mining industry in the peninsula the impulse which was anticipated. This leads him to inquire whether the country can ever become a mining region; and, after an elaborate description of the geological conditions, he comes to the decision that the geological formations, by their nature and disposition, are such as should contain minerals in abundance, while the economical conditions are eminently favorable to the development of the mining industry. Apart altogether from inferences from the nature of the rocks, it is known that sapphires, gold, tin, copper, zinc, antimony, lead, iron, coal, marble, and china clay exist, and many deposits of these are worked to some extent. Burmese prospectors found sapphires on the left bank of the Meekong in 1890, and for a time worked the beds with success; auriferous deposits, especially in the alluvial form, are numerous, and they have been worked by the natives from time immemorial. Several mining companies are at work at these deposits, but the production is still very small. Tin is worked to a very small extent, and lead, copper, and antimony not at all. Rich deposits of iron in Cambodia have been worked by the natives, and coal is being worked in Tongking and Annam by French companies, of which there are two whose operations are considerable—those working at Hon-Gay and Kebo. The Hon-Gay Mine is the only one that pays a dividend to its shareholders. On the whole, M. Bel's opinion is that, while Indo-China may never be conspicuous in the world by its mining industry, it possesses deposits as capable of development as most other regions of the earth of equal area, but that development could scarcely be less than it is at present. This is due to a variety of causes—the Black Flag troubles at the outset in Tongking, the restrictive and conservative legislation of earlier years, and want of confidence amongst capitalists at home in Indo-China. But these and other unfavorable circumstances have changed or are changing, and, in time, a mining industry will arise in Indo-China.

IRON ORE IMPORTS.—Imports of iron ore into the United States for the month of January were 63,521 tons, against 33,353 tons in January, 1901; showing an increase of 30,168 tons this year.

PROGRESS AT IDAHO SPRINGS, COLO.

By H. FOSTER BAIN.

In 1901 Clear Creek county materially increased its output, and the Idaho Springs district made the largest percentage of increase of any district in the State. The total outputs are tabulated below:

	Clear Creek County.	Idaho Springs District.
Gold	$955,200	$938,520
Silver	906,313	469,260
Lead	175,072	109,494
Copper	46,926	46,926
Total for 1901	$2,083,511	$1,504,200

The production of the year shows an advance of between 25 and 40 per cent over that of 1900. It is interesting to study the reasons for this advance. Evidently the district not only obtained its full proportionate share of the general prosperity but did even better. The most obvious reason for this is the coming in of new capital and the beginning of operations on a larger scale. Since the very beginning of the gold industry of the western States, Clear Creek and its neighbor, Gilpin County, have kept up a steady output of gold. The individual operations have been, however, small as compared with those of other camps. In 1900 the first fruits of the deep tunnel system, which has been adopted in this district, were realized when the Newhouse tunnel cut a magnificent body of ore on the Gem vein. This strike demonstrated as nothing else could the permanence of the veins and ore shoots. In 1900 capital began to come into the district as a result of this strike. The active prosecution of the Monarch tunnel, designed to undercut the Freeland and Lamertine group of mines, was undertaken by Colorado Springs capital. The Central tunnel and the Lucania were started towards Gold Hill in Gilpin County, the objective point of the Newhouse enterprise. Numerous small properties were brought together into groups, and active developments undertaken. The Sun and Moon Mining and Milling Company got possession of the Garden, a neighboring property, and the resulting groups made one of the heaviest producers of the year. Another important consolidation was that of the Belman, Dove's Nest and other properties, which were brought together by the Big 5 Association. The Specie Payment, on Belleview Mountain, was sold to Eastern people at a reported price of $600,000, and has since the sale been a large producer.

One of the important events of the year was the practical introduction of electric power into the district. The old Idaho Springs Electric Company had never made any effort to sell current except for lighting purposes. It sold out to the Seaton Mountain Electric Light, Heat and Power Company, which promptly acquired important water rights extending along Clear Creek, from Idaho Springs to Floyd Hill, and put in both water and steam power plants. It has strung power lines through the district and is now doing a growing business with samplers, mills and mines. The Cascade Electric Company extended the wires which had carried power to the Lamertine mine, Georgetown, and entered the district as a competitor. As a result the district is now well served at very low rates.

Since the first of the year the old adage, "Nothing succeeds like success," has been abundantly verified in this district. The consolidation of mines has gone merrily on. The Newton and General Thomas have been joined to the Mattie, so that now a mile of territory along this important vein is brought under one management. This, with the activity of the Burns-Moore tunnel project and the successful application of cyanide to the ores of the Gold Standard, indicates that the Chicago Creek mines will be among the most active in the district during the coming season.

The ores of the district are essentially low grade, and must be concentrated. There are now mills in operation with a total capacity of nearly 800 tons per day. In addition the works of the Idaho Springs Reduction Company, modern in every respect, are about ready to start. This plant will take care of 125 tons per day. The Wilkie mill is being rebuilt and enlarged, and the Detroit, a 100-ton custom mill,

will soon be begun. The Clear Creek Mining and Reduction Company, operating a pyritic smelter at Golden, has entered the market for ores, and a number of mills are to be remodelled this summer. Taken in all, everything indicates that the present season will be one of unusual activity. Since the first of the year five large compressors, having a combined capacity of 30 piston drills, have been set in this camp. In addition there are one or two now contracted for, and soon to be put in position.

THE MINNEQUA WIRE MILL.

Special Correspondence.

Of the many and marked changes and improvements now in progress at the works of the Colorado Fuel and Iron Company, at Pueblo, Colo., the new wire mill is the most extensive. It is stated that when completed this mill and its adjuncts will be much larger than any other like establishment in the United States. It is proposed to turn out wire of all sizes and shapes, including cable, telegraph, telephone and field wire, also barbed wire and woven wire of all sizes, and electric wire, both naked and insulated. To this is to be added the important product of wire nails.

The location is in the southern part of the grounds of the Minnequa, or main works. The area of the floor space will be over 400,000 square feet, and at least 7,000,000 bricks will be used in the walls, in addition to the stone of the foundations. No concessions have been made to artistic effect at the sacrifice of the primal purposes of utility and convenience. When this mill is finished it is estimated that its pay roll will include over 2,500 names, most of which will be of skilled workmen. To this number at least 500 more should be added for the rod mill. The wire mill is expected to have an annual capacity of 250,000 tons, and a daily output of 300 tons of wire nails and 150 tons of field fence wire.

It is expected to have the mill in operation by mid-summer. Extensive as are these improvements, it is proposed to follow them by the manufacture of iron and steel in many other commercial forms, until at length there will be abundant facilities for supplying the entire western demand, including the Pacific Coast and, presumably, to enter as strong competitors for the trade of Japan and China, including also the Russian provinces adjacent to the Pacific.

MAP OF THE PHILADELPHIA REGION.—An excellent topographic map of the city and vicinity of Philadelphia has recently been issued by the United States Geological Survey. It is on a scale of about 1 inch to 1 mile, and shows the city and the suburban districts to the south and west in great detail. Adjoining it on the west is another topographic map, just issued, the Chester sheet, which shows the city of Chester and the surrounding country to the Delaware line. These two sheets, with the two lying just to the north of them, the Norristown, and the Germantown sheet, may be mounted together to make a comprehensive map of the Philadelphia region. On these sheets the relief or topography of the country is shown by contour lines.

THERMO-ELECTRIC TESTS OF NICKEL STEEL.—The thermo-electricity of steels and nickel steels formed the subject of a paper read recently before the Paris Academy of Sciences by M. G. Belloc. The proportions of nickel in the nickel steels studied varied from 5 to 35 per cent. The general form of the curve giving the relation between the electromotive force and the temperature for platinum-nickel steel couples is parabolic, the alloy containing 5 per cent of nickel being exceptional in this respect. The steels containing 5 per cent and 28 per cent of nickel at about 400° to 500° C. show sharp variations, indicating molecular transformation. The 28 per cent nickel steel is remarkable for its high neutral point and the great electromotive force developed.

COMMERCIAL CYANIDE OF POTASSIUM.*

By Russell W. Moore, A.M., M.Sc.

The present tariff act, generally known as the Dingley law, is the first of the United States tariffs to provide for potassium cyanide by name. Paragraph 66 levies a duty of 12½ per cent on this salt which is one-half of the general provision for chemical salts (25 per cent).

After the passage of the act it was noticed that much of the salt imported into the United States was in fact a mixture of the cyanides of potassium and sodium, and as no separate provision was made in the tariff for sodium cyanide the question arose as to the proper rate of duty on mixtures of the above character. This question was tried before the Board of General Appraisers on four samples of potassium cyanide, each containing from 14 to 22 per cent of sodium cyanide. The decision of the general appraisers was in favor of the lower rate of duty (12½ per cent) on the general ground that ordinary commercial potassium cyanide often contains impurities, especially sodium compounds.

While this case was under consideration a large number of importations of cyanide were tested for their content of sodium cyanide. Of 80 samples of commercial potassium cyanide, 24 contained no sodium cyanide, while the remaining 50 contained from 10 to 54 per cent of the sodium salt with an average in the neighborhood of 22 per cent.

Considering the question from a tariff standpoint it will be seen that decision of the general appraisers covered an article containing as high as 22 per cent of sodium cyanide. The further question remains, When does the content of sodium cyanide reach a point at which the mixture of salts can no longer be considered either commercially or legally as potassium cyanide, but rather sodium cyanide, containing some potassium cyanide?

The further and industrially more important question on the effect of sodium cyanide in the cyanide process is one that can be settled only in a practical way. t is, however, apparent that much if not most of the cyanide treatment of ores has been carried on not with potassium cyanide, but with a mixture of solution of potassium and sodium cyanides.

FREE SULPHUR IN BEAUMONT PETROLEUM.*

By Clifford Richardson and E. C. Wallace.

All chemists who have examined this singular product have observed its high contents in sulphur, but no one has determined the forms in which it appears apart from the sulphuretted hydrogen dissolved in the crude oil.

Dr. David T. Day, at the Petroleum Congress in Paris in 1900, gave some results of an investigation into the selective action of fullers earth filter. The hydrogen sulphide was first removed by passing a current of air through the oil, which was then forced through glass tubes packed with the fullers earth, ground to pass a 60-mesh sieve. The tubes were 19 inches long and ⅞-inch in diameter. The oil passed through slowly. In 24 hours, 5 cubic centimeters had been collected. This was water white in color and had a sweet odor, although the crude oil was dark and odor rank.

A remarkable fact developed by the investigation is that the denser fractions, and particularly the second, after standing for about 30 days, deposits beautifully regular crystals of sulphur. They amount to 0.25 per cent of the oil. The question is, Did the sulphur originate in the decomposition of some constituent of the petroleum? It does not seem probable, but it is argued that if the oil contain hydrogen sulphide, this might be oxidized to H_2O and S by the oxygen in the pores of the fullers earth. This possibility is excluded by the fact that the sulphuretted hydrogen has been removed prior to filtering. The possibility of the formation of the sulphur by the filter is, on the other hand, brought out by the fact that the sulphur crystals separate in the second filtrate. The evidence seems to be in favor of the conclusion that free sulphur occurs in the oil as it comes from the well. Its presence accounts for the H_2S in the crude oil, and that H_2S is evolved upon heating the oil to 200°C. after first freeing it from that found in the crude oil. Free sulphur also accounts for the variable nature of the products and to be the cause of the great instability of this interesting petroleum.

*Abstract of a paper read before the New York Section of the Society of Chemical Industry.

Following this, other fractions were collected which had the following characteristics, as compared with the crude oil:

	Amount cubic centimeters.	Color.	Specific Gravity, 25.25° C.	Sulphur.	Remark.
Crude Oil.		Deep brown.....	.914	1.75%	Rank odor.
1st Fraction.	5	Water white.....	.8755	.80	Sweet "
2nd "	21	Pale lemon.....	.8986	.91	" "
3rd "	8	Deep lemon.....	.9038	1.04	" "
4th "	22	Amber fluorescent	.9068		" "
5th "	10	Amber "	.9104		" "
6th "	22	Deep amber "			" "
7th "	13	" " "	.9115		" "
8th "	20	" " "	.9115		" "

The sulphur, after removing the hydrogen sulphide held in solution, was 1.75 per cent of the crude oil, that in the first fraction but 0.8 per cent. The selective action, therefore, consists not only in the removal of the color from the crude petroleum but also in a true fractionation, as shown by Dr. Day, and a separation of a large part of the sulphur compounds from the earlier fractions. The last fractions more easily approach the specific gravity of the original oil, but are quite free from the dark color or odor of the original oil.

CHEMICAL HARD LEAD.—This term is used to designate certain brands of lead which are produced from the non-argentiferous ores of Southeastern Missouri. It is especially adapted to the manufacture of sheet and pipe which have to withstand the action of acids, and it finds a ready market for that purpose, usually at a premium of 5 cents per 100 pounds above the price of common Missouri lead. At one time in 1901 there was an especially good demand for chemical lead, and temporarily it commanded a price somewhat higher than that for desilverized lead. The relative values of the different brands of lead in the St. Louis market are frequently subject to such variations. As to what constitutes chemical hard lead there is no definite rule. Its peculiar property appears to be due to small percentages of copper or antimony, or both, in its composition, which are not removed by the methods of refining (liquating and poling) in use in the district but no attempt is made to control the composition within precise limits. The intentional preparation of chemical hard lead is the subject of a patent recently granted to H. Leyendecker, of Cologne, Germany (British patent No. 2,756 of 1901) who claims the alloy of lead with 0.1 to 0.5 per cent copper; and the alloy with 0.1 to 0.5 per cent copper and 0.1 to 0.3 per cent antimony.

PROSPECTING IN GERMAN SOUTH AFRICA.—The firm of A. Goetz & Company, Limited, of Johannesburg, is reported to have obtained exclusive prospecting rights from the German Colonial Company for Southwest Africa, with regard to precious stones, minerals and metals, including gold, silver and other ores on a large tract of territory in Damara Land for a term of 15 years. At any time during that period the Goetz Company will have the right on payment of $150,000, besides refunding 2¼ per cent on the gross value of the minerals and metals mined by the company, to take up any portion of the territory for mining purposes. The Goetz concern is also empowered to construct railways within the territory, which covers 6,500 square miles, for the use of the mines, either to Swakkopmund direct or to any point of the Swakop-Windhoek Railway line. The company has also acquired for its lines the right of carrying ordinary passenger and freight traffic. Copper is said to have already been discovered at several places within the territory.

RECENT DECISIONS AFFECTING THE MINING INDUSTRY.

SPECIALLY REPORTED.

RESERVATION IN GAS LEASE.—A lease of land for gas and oil purposes was subject to a reservation "Land surrounding farm buildings, and marked by stakes, and as a protection against fire." It was held that the landlord had no right to drill a well, and take out the oil, upon the reservation mentioned in the lease.—Lynch v. Burford (50 *Atlantic Reporter,* 228); Supreme Court of Pennsylvania.

LIABILITY WHEN MINE OPERATOR FAILS TO COMPLY WITH THE LAW.—Where it appears that the injuries were inflicted by the wilful violation, or the wilful failure to comply with the positive requirements of a statute relating to mines and miners, it is no defense to show that the person injured by reason of such violation was himself negligent, and thus contributed to such injury, or that, with full knowledge of the increased hazards caused by such failure of the employer, he continued in the service and assumed the risks of it.—Himrod Coal Company v. Adack (94 *Appellate Court Reporter,* 1); Appellate Court of Illinois.

DUTY ON SCRAP METALS.—Old scraps of metal, consisting of the shells of exploded cartridges and the scrap metal from which the same were originally cut, collected around arsenals, and composed of copper and nickel with traces of lead, but containing no zinc, copper being the component material of chief value therein, are not assessable with duty as "argentine, albata, or German silver, unmanufactured," under the provisions of paragraph 174, act of July 24, 1897, and are not included within the provisions of section 6 or paragraph 588 of said act, but are specifically included within and entitled to free entry under the provisions of paragraph 533 of said act.—Appeal of Orford Copper Company from Collector of Customs at New York; Board of General Appraisers.

RISK ASSUMED BY WORKMEN WHILE UNLOADING COAL.—Where an expert workman was injured while unloading coal and prior to the injury had noticed certain defects in the manner in which the coal was being unloaded and had called the attention of the foreman to such defects, and the latter had replied that he would remedy them in a moment, and the workman had replied "All right," and continued at his work, and was injured because of such defects, he had continued to assume the risks of the employment and could not recover from his employer for injury.—McClusky v. Garfield & Prostir Coal Company (61 *Northeastern Reporter,* 804); Supreme Judicial Court of Massachusetts.

PATENTS TO LAND WITHIN JURISDICTION OF DEPARTMENT IMPERVIOUS TO COLLATERAL ATTACK.—The Land Department of the United States constitutes a special tribunal, vested with judicial power to hear and determine the claims of all parties to the public lands, subject to its disposition, and with power to execute its judgments by issuing patents to all parties entitled to them. Such patent evidences the judgment of the department, and constitutes a conveyance of the legal title of the nation to the patentee in execution of the judgment. It is, like the judgments of other tribunals, impervious to collateral attack, for errors of law committed by the department as for mistakes of fact. The remedy for errors of law, as well as mistakes of fact, in the issue of such patent, is a direct proceeding by bill in equity to correct them. The general rule is that public lands are subject to the disposition of the department, and a patent is, therefore, presumptive evidence that the department had jurisdiction, and that it rightfully exercised it, and if there could have been any state of facts which, under the laws, would have given the department jurisdiction to dispose of the land, the presumption is that this state of facts existed, and the patent is not open to collateral attack. But where the title had passed from the United States before the claim on which the title was based was initiated, land reserved from sale and disposition for military or other like purposes, land reserved by a claim under a Mexican or Spanish grant *sub judice,* and land for the disposition of which Congress has made no provision, is not entrusted to the disposition of the Land Department, and its patents to such land are void on their face, and may be collaterally attacked.—King v. McAndrews (111 *Federal Reporter,* 860); United States Circuit Court of Appeals.

MINES MUST BE INSPECTED WHEN LAW REQUIRES IT.—Where the law requires that mining bosses shall visit their miners at stated intervals in their working places and see that they are made secure, and that a sufficient supply of props and timbers are always on hand, a definite standard is fixed by the legislature and it is the duty of the employer to use the very means named in the statute. He is not at liberty to adopt others, though, in his opinion, they are more efficacious than those prescribed by the lawmakers. There can, then, be no basis for an agreement, implied or express, that the employer shall violate the law, and that the employee be remediless. The doctrine of assumed risk, in its essential nature, constitutes a defense. The employee brings an action for damages for personal injury. It is based upon the employer's negligent failure to discharge a duty owing to the employee. Duties and rights are correlative—what is the duty of the employer to do for his employee is the right of the employee to require of his employer. As a general rule, the right of contracting as one sees fit stands untrammeled; but the State has power to restrict this right in the interest of public health, morals and the like. If the legislature has clearly expressed the public policy of the State on a matter within its right to speak upon authoritatively, and if that public policy should be subverted by allowing the employee to waive in advance his statutory protection, the contract is void as unmistakably as if the statute in direct words forbade the making of it. This is not class legislation, for employments differ in degree of hazard; each has its separate dangers which must be guarded against in the appropriate way. The purpose of such statute to promote the safety of miners being clear, and the right of the legislature to pass it being unquestionable, the court should not declare it a dead letter; that would be practically a judicial repeal of the act. It is no hardship to the employer to disallow him a defense based on an agreement, express or implied, that he should violate a specific statutory duty. His sure protection lies in obedience to the law. The risks that still inhere in the business after this is done may be assumed by the employe.—Davis Coal Company v. Polland (62 *Northeastern Reporter,* 493); Supreme Court of Indiana.

ABSTRACTS OF OFFICIAL REPPORTS.

Hecla Consolidated Mining Company, Montana.

The report of this company, which owns mines near Glendale, in Beaverhead County, Montana, covers the year ending December 31, 1901. During that period the earnings from all sources were $139,562, while the total expenditure was $107,804, leaving a cash profit for the year of $31,758. From this dividends amounting to $30,000 were paid, leaving a balance of $1,758. Adding this to the surplus carried forward from 1900, which was $39,077, left a total of $40,835 at the close of 1901.

The total production of ore from the mines during the year was 1944 tons, the average cost of mining being $33.46 per ton. The first-class ore was shipped to Melrose. No second-class ore was mined during the year, but 3,844 tons of second-class ore from the old dumps was sent to the concentrator of the Greenwood Mining Company, which has leased these dumps. The company's own smelter was not in operation during the year, the ores having all been sent to other smelters for treatment.

The metals produced from the ore shipped included 201 ounces gold, 220,741 ounces silver, 103,691 pounds of copper and 767,249 pounds of lead.

Superintendent S. A. Barbour reports that prospecting work was carried on during the year, but with no marked results the outlook for ore production was not materially changed by this work. It is believed, however, that if the Atlantis ore shoot is followed down and the tunnel pushed it is possible that another ore body may be found in that ground.

The report of General Manager Knippenberg says: "During the year a considerable amount of prospecting was done in the Atlantis, True Fissure and Cleve mines. The work done and the money expended on these mines deserved better returns than we have received. The increase of water in the Cleve Mine will probably render a large pumping plant a necessity in the near future. This will cost, perhaps, $7,500. The operations at Greenwood by the tailing lessees resulted in failure, from a financial standpoint; but the outlook for 1902 is more promising. We received as royalty from these lessees during the year 1901 $3,258.

"As to what may be expected for the year 1902, I can only say that we hope to make a better and more profitable showing at its close. The steady decline in the prices paid for our products—lead and silver—is discouraging. These prices may yet go low enough to wipe out all profit."

Borax Consolidated, Limited.

The report of this company, as just issued from the London office, covers the year ending September 30, 1901. The capital account of the company shows £800,000 in preferred stock, £600,000 in common stock and £1,000,000 in debentures carrying 4½ per cent interest. The profit and loss account shows profits from trading, £276,859; interest, etc., £5,200; total, £282,059. General and office expenses were £24,038; debenture interest, £45,000; income tax, £1,918; depreciation reserve, £15,000; debenture redemption, £5,825; total, £91,781, leaving a balance of £190,278. From this interim dividends of £22,000 on preferred stock and £30,000 on ordinary stock—£52,000 in all—were paid, leaving £138,278. Adding £13,360 brought forward from previous year, gives a total surplus of £151,638. The directors' report says:

"Of this balance of £151,638 to the credit of profit and loss account, after providing for the items above mentioned, the final dividend on the preference shares and the third interim dividend on the ordinary shares paid on November 1, absorb £37,000; and from the balance the directors propose to pay a final dividend of £1 per share, less income tax, on the ordinary shares, making 17½ per cent for the year and taking £60,000; to place to general reserve, £30,000; to write off expenditure on inspection and development of properties, £8,843; leaving a balance to carry forward to the next account of £15,795. The mortgage of £13,786 on one of the company's properties, which existed at the time of its acquisition, and which appeared in last year's balance sheet, has been paid off.

"The mines and deposits at present worked by the company continue to give highly satisfactory results. Systematic development work has been carried on, and the directors are glad to report that, apart from the enormous reserves of valuable mineral existing in the company's properties that are not at present being operated, the amount of high-grade borate in sight in the properties now being worked is sufficient for the world's requirements for many years to come. The general cost of production has been reduced and it has been the aim of the management to lessen this cost in every possible way, thus placing the company in a position to command the best mineral at the lowest possible figure, and enabling it to offer its products to its large clientele of industrial consumers at prices which will encourage an increasing consumption. The refineries with the mining and manufacturing plant and machinery have been kept in a high state of efficiency. Taking into consideration

the depressed condition of trade which has existed in some of the places where the company has many customers, the demand for its chemical productions has been satisfactory."

Delaware, Lackawanna & Western Railroad Company.

This company owns an extensive railroad system and in addition owns in fee a large anthracite coal property in the Lackawanna District in Pennsylvania. The report covers the year ending December 31, 1901. During that period the earnings of the railroad system were $23,507,634, while the expenses were $14,385,418. After paying all expenses and other charges the surplus remaining was $3,030,054, from which dividends amounting to $1,834,000, or 7 per cent on the stock, were paid.

The details given below relate to the Coal Department of the company, the accounts of which are kept separately from those of the railroad lines. The coal mined and sold with the earnings and expenses were as follows for the year:

Coal Sales:	Tons.	Amount.	Per ton.
At mines	98,808	$196,859	$1.99
Company's supply	982,003	1,018,539	1.04
Local agencies	4,715,867	16,433,062	3.48
Foreign agencies	1,537,577	8,551,548	5.56
Total sales	7,334,255	$26,200,008	$3.57
Earnings, company's boats	531,290	166,166	0.31
Increase in coal on hand	183,161	752,040	4.11
Totals	7,517,416	$27,118,214	$3.61
Coal mined and purchased	7,517,416	$11,288,071	$1.50
Transportation of coal	6,123,978	12,274,500	2.00
Coal agency expenses	6,253,444	572,805	0.09
Commissions on sales	3,618,598	746,553	0.21
General expenses	7,517,416	91,023	0.01
Vessel expenses	531,290	184,766	0.61
Improvements	7,517,416	321,853	0.04
Total charges	7,517,416	25,479,571	$3.39
Profit	7,517,416	$1,638,643	$0.22

The amount paid for transportation of coal included $10,656,340 on 6,123,978 tons carried over the Delaware, Lackawanna & Western lines—an average of $1.74 per ton; and 1,618,160 on 2,374,485 tons carried over other lines beyond the company's own—an average of $0.69 per ton.

The coal traffic statistics of the railroad for two years past are reported as follows:

	1900.	1901.	Changes.
Coal transp'n tons	6,091,133	7,398,057	I. 1,306,924
Coal ton miles	928,174,664	1,206,817,509	I. 278,642,845
Average dist. carried	152 miles.	163 miles.	I. 11 miles.
Rate per ton-mile	0.920 cent.	0.891 cent.	D. 0.029 cent.

The average rate per ton-mile on general freight last year was 0.683 cent, being 0.208 cent less than the coal rate. The increase in ton-mileage last year was 30 per cent. The railroad earning from coal were $10,749,344.

The report says: "The results of the operation of the Coal Department during the past year are very satisfactory. There has been a large and steady demand for coal throughout the year from all parts of the country where the coal mined by the company is marketed, and in consequence the mining, shipment and sale of coal have been more evenly distributed throughout the year than ever before in the history of the anthracite trade. The mining operations of the company have been carried on successfully with but slight interruption from accidents or casualties of any kind, and the physical condition of the mining properties and collieries not only fully maintained, but in many respects, substantially improved. The improvement work done during the year cost $321,853. Further work of a similar character is planned for the coming year which, while adding to the productive capacity of the company's collieries and keeping up the quality of its coal to the well-known high standard it has obtained, will tend to enable it to mine and prepare its coal as cheaply as in previous years. The demand for the washery coals produced by the company's four washeries from the old culm banks has been very heavy during the past year; the amount reclaimed and shipped from the washeries during the year was 822,000 tons. These coals seem to be continually growing in favor for steam purposes, and with the view of keeping pace with this demand another washery is under construction, with the probability that still another will be built during the coming year.

"The marketing of anthracite coal during the past year by the different large interests owning a large percentage of this coal deposit, has been conducted with exceptional good judgment and in the most harmonious spirit. To this is due the excellent results obtained during the year in the handling of this great and growing industry. The present outlook is favorable to an indefinite continuance of these favorable conditions. There has recently developed more or less talk or threats of strikes being declared by the miners during the coming spring in event the anthracite companies will not concede certain demands of some of the professional labor agitators, the evident purpose of which is to strengthen the control of these agitators upon the men through their labor organizations. It should not, however, be possible with the miners and other employees in and about the mines in the anthracite districts earning as much money as they are and have been doing throughout the past year, for these labor leaders to precipitate such a calamity on this body of prosperous, contented workmen for as little reason or cause as they are urging. This company during the past year paid its various mine employees $1,412,000, or 30 per cent, more than during the year previous.

Arizona Copper Company, Limited.

The report of this company, as issued from the office in Edinburg, Scotland, covers the year ending September 30, 1901, and shows receipts as follows: Copper produced, £622,937; Arizona & New Mexico Railroad, £134,217; transfer fees, £243; total, £757,397. The expenses were: Mining and smelting, £360,629; general charges, £11,146; railroad expenses, £41,323; total, £413,098, leaving a profit of £344,299. Interest on debentures and preferred stock, etc., amounted to £78,569, leaving a balance of £265,730. The balance brought forward from 1900 was £60,234, making the total surplus £325,964.

The superintendent's report for the six months ending September 30, says that 29,285 tons of copper ore and concentrates, and 1,181,612 pounds of copper derived from the leacher, were smelted, resulting in a gross yield of 8,422,690 pounds (not including 103,594 pounds of copper produced as bluestone), which was equal to a monthly average of 702 tons. Of this, 362 tons were obtained from the smelting of copper ores and concentrates, representing an average yield of 12.33 per cent. In the mill 102,961 tons of concentrating ores were treated and yielded 17,049 tons of concentrates. Of the 102,961 tons of ore treated, 38,411, or 37.3 per cent, were obtained from Metcalf and Coronado, and 64,550 tons, or 62.7 per cent, from the Humboldt Tunnel workings and from Yavapai, Nos. 1, 3 and 4 concentrators treated 65,634 tons and No. 5 treated 3,191 tons of sulphide ores, while No. 2 concentrator disposed of 34,136 tons of oxide ore, which was obtained from Metcalf and mines tributary to that field. In the mill 6.04 tons of raw ore produced 1 ton of concentrates, as against 6.42 for the last six months.

The operation of the acid plant resulted in a yield of 1,463.2 tons of sulphuric acid (H_2SO_4). During the previous half year the output of acid was 2,418.4 tons. The remaining lead chambers gave way, being completely worn out, and this was responsible for the poor results. All of the lead chambers have now been rebuilt except one, which is almost completed. An improvement may, therefore, be looked for. The Leaching Plant treated 19,100 tons of tailings, and produced 1,186,638 pounds of copper. In addition, it produced 207.19 tons of bluestone, which contained 51.8 tons of copper. The yield per cent (including copper contained in bluestone was 3.37, as against 3.82 for the last term, when 25,401 tons of tailings were treated.

Including fluxes, 123,082 tons of ore were treated, the yield being equal to 3.42 per cent. In the previous term the tonnage amounted to 159,074, and the yield to 3.62 per cent. In all 116,569 tons of copper ore were treated, of which 102,961 tons, or 88.3 per cent, were concentrating ores. The average yield of all copper ores treated was 3.61 per cent. Including bluestone the yield was 3.66 per cent. First-class ores yielded 1,314.6 tons of copper, while the concentrating ores (including the leacher output) contributed 2,951.1 tons (including copper in bluestone). The yield from concentrating ores was 2.86 per cent, as against 3.20 per cent, in the previous half year.

The directors' report says: "The first charge upon the surplus of £325,964 is the dividend for the year to September 30, 1900, of 9s. per share, free of tax, on 32,000 deferred ordinary shares, amounting, under deduction of certain sums paid to account thereof, to £13,011. After deducting this amount, which was paid on July 29 last, from the above total surplus, the net surplus remaining is £312,953. To account of the dividends for the year to September 30, 1901, the directors paid on July 29 last interim dividends of 9s. 6d. per share, free of tax, on 316,530 preferred ordinary shares and on 32,000 deferred ordinary shares, which absorbed £165,552. Since that date 31,444 deferred ordinary shares have been issued with right to whatever dividend may be declared for the year, under deduction of the above interim dividend. The directors therefore recommend that dividends be now declared for the year to September 30, 1901, of 16s. 6d. per share, free of tax, on 316,530 preferred ordinary shares and on 63,444 deferred ordinary shares, under deduction of the 9s. 6d. per share already paid to account thereof, absorbing £132,991, and that the balance of £14,410 be carried forward. It is proposed that the balance of these dividends, 7s. per share, be paid February 28.

"The production of copper for the second half of the financial year was interfered with by the rebuilding of the smelting works and the carrying through of the other improvements on the company's works and plant at Clifton. Notwithstanding this, the production for the whole year was larger than that of the preceding year by about 700 tons, and the free profits exceeded those of the preceding year by over £28,000. The cost of the improvements and extensions executed at Clifton and on the railway during the year amounted to £251,524, which sum has been met by the issue of 31,444 deferred ordinary shares of £1 each, at £8 per share. While these improvements have cost considerably more than the amount anticipated, the company has been placed in a very satisfactory position by the outlay. It may be pointed out that while during the past three years over £390,000 has been expended on permanent improvements, the book value of the company's properties has not been written up in respect thereof, but stands in the balance-sheet at a less figure than it did before the improvements were executed.

"The construction of the new railroad from Lordsburg to Hachita, about 38 miles in length, is being proceeded with, and the work will be completed during the current financial year. Arrangements have recently been made under which it is anticipated that a considerable quantity of outside traffic will be carried by the Coronado Railway—and, in terms of these arrangements, the track of that railway from Longfellow to Metcalf is being widened to the 3-ft. gauge. Finding that, in view of the recent increase in the capacity of the smelting plant, it would be largely to the advantage of the company that the capacity of the bessemer plant should be further increased, the directors have given authority for this being done.

"The sale of certain of the mining claims belonging to the company, referred to in the report for the half-year to March 31 last, was completed subsequent to the closing of the accounts on September 30, 1901. The amount received was about £154,000, and it has been handed over to the trustees for the debenture stockholders. The directors had anticipated that this sum would be made available to the company to meet the cost of the new railroad and the other outlays referred to above, but the trustees are advised by counsel that this cannot be done. The directors have accordingly made certain proposals to the debenture stockholders for dealing with the above £154,000, and for the immediate surrender to the Copper Company of the bonds of the Arizona & New Mexico Railway for £266,000. A meeting of the debenture stockholders has been convened to consider these proposals."

BOOKS RECEIVED.

In sending books for notices, will publishers, for their own sake and for that of book buyers, give the retail prices. These notices do not supersede review in a subsequent issue of the ENGINEERING AND MINING JOURNAL.

New Zealand: Official Year Book, 1901. Prepared by E. J. von Daddszen, Registrar-General. Wellington, N. Z.: Government Printer. Pages, 640.

Statistics of the Six States of Australia and of New Zealand, 1861-1900. Compiled by T. A. Coghlan, Statistician of New South Wales. Sydney, N. S. W.: Government Printer. Pages, 80.

Twelfth Census of the United States, 1900. *Population. Part I.* Prepared under the direction of William C. Hunt, Chief Statistician for Population. Washington: Government Printing Office. Pages, 1006.

La Guyane Francaise en 1902. By David Levat. Paris, France: Imprimerie Universelle. Pages, 124; with three maps and 25 photogravures.

Electrical Engineering Testing. By G. D. Aspinall Parr. London: Chapman & Hall, Limited. Philadelphia: The J. B. Lippincott Company. Pages, 474; illustrated. Price, $3.50.

NEW PUBLICATIONS.

Pumps; their Construction and Management. By Philip R. Bjorling. London: P. S. King & Son, 1902. Pages, 62. Price (in New York) $1.25.

This little book is a reprint of a series of articles published in the *Engineering Times*. The author states that his object is to give descriptions and illustrations of the different classes of pumps ordinarily in use, together with practical hints on their construction, care and management. The work consequently contains no mathematical calculations nor any discussions of a theoretic character, but is written as a practical guide to designers and users of pumps.

The author classifies pumps as follows: Ram pumps, single and double acting; bucket pumps; piston pumps; bucket and ram pumps; piston and ram pumps; ram and ram pumps; centrifugal pumps; rotary pumps; revolving pumps; diaphragm pumps, and pulsating steam pumps. The construction of each class is shown by some remarkably clear diagrams, while numerous half-tone cuts give the general appearance of some of the more noteworthy types.

The book is written from a British standpoint, and the pumps shown are made by British firms. Considering the great work done by Henry R. Worthington, American readers will regret that the author's field of view was so limited, though Worthington's pumps are described. Again, there is much greater variety in pump construction in Great Britain than in this country. Our pump makers have, as a rule, adhered to a few standard types, and whether or not because of good original design have not changed their patterns much. Again, the value of the work would have been increased had the author discussed more fully the question of comparative efficiency. As is well known, many piston pumps, particularly those of smaller size, are wasteful of steam, and there is certainly room for a work on pumps that will discuss this matter of steam consumption in a plain-spoken way. Mr. Bjorling has much to say about the construction of the water end of pumps, less about the steam end. A strange omission is the neglect to say anything about pumps with mechanically actuated valves, one of the really great advances in pump construction.

So far as the work goes, however, it is to be commended for its clearness and thoroughly practical character and the suggestions on the design and care of pumps are excellent.

The Journal of the Iron and Steel Institute. Volume LX. No. II. Edited by Bennett H. Brough, Secretary. London: E. & F. N. Spon, Limited. New York: Spon & Chamberlain. Pages, 596; illustrated.

It is hardly necessary to repeat here that the *Journal* of the Iron and Steel Institute always contains material of much interest and value. There are very few publications of this class which maintain so high a standard. The present volume is no exception to the rule. While it is difficult to select from the various papers included in this volume, perhaps the most immediate interest attaches to the paper by Mr. B. H. Thwaite on the "Profitable Utilization of Power from Blast-furnace Glass." The author has gone into this subject very thoroughly, and sums up the work done in this direction very completely. This paper was discussed by Messrs. Lurmann, Allen and others, whose remarks add value to the paper.

An important part of this volume consists of the short notes and summaries of papers and articles published during the past year. It is in effect a summary of technical literature on iron, steel and allied subjects, and is very carefully prepared. It covers the bibliography of iron and steel, and includes also many notes on coal, coke and other fuels, such as gas and the various hydrocarbons.

Other papers in the present volume, besides those already mentioned, are the "Presidential Address," by Mr. William Whitwell; "Iron and Steel Industries of the West of Scotland," by H. Bumby; "Variations of Carbon and Phosphorus in Steel Billets," by A. Wahlberg; "Correct Treatment of Steel," by C. H. Ridsdale; "Alloys of Copper and Iron," by J. E. Stead; "Effect of Copper on Steel for Wire Making," by J. E. Stead and F. H. Wigham; "Calcium in High-grade Ferro-silicon," by G. W. Gray; "Spectra of Flames During the Basic Bessemer Blow," by W. N. Hartley and H. Ramage; "Brinell's Method," by A. Wahlberg; "Internal Strains in Iron and Steel," by A. Wingham. There is also a report by the secretary on the International Congress held to promote the unification of methods of testing.

CORRESPONDENCE.

We invite correspondence on matters of interest to the industries of mining and matellurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will published when so requested.

Letters should be addressed to the MANAGING EDITER.

We do not hold ourselves responsible for the opinions expressed by correspondents.

Navigation of Tanana River, Alaska.

Sir: In your issue of February 15, page 244, there is a note on the navigation of the Tanana River, Alaska, which contains some mis-statements. The Tanana River has been mapped for its entire length by the United States Geological Survey (See *Twentieth Annual Report*, Part VII; *Twenty-first Annual Report*, Part II). I quote as follows from the first-named report:

"There are no serious difficulties in ascending the Tanana by steamer to where the river broadens out above the mouth of the Cantwell, a distance of about 170 miles. From this point to where the Forty-mile and Mentasta trail crosses the river can only be ascended by a steamer which is especially adapted to the purpose. Such a steamer should be capable of making progress against an 8-mile current and should have facilities for warping where it was necessary. In this section of the river there are usually many channels, and by carefully picking the route much of the swifter water can be avoided. A steamer in going upstream should always have a small boat ahead to pick out the best channel. A slough some 30 miles in length, which is suitable for a steamboat, is said to extend along the north bank from below the mouth of the Chena river to the Salchaket. At the time of our journey last summer (1898) we met a steamer about 100 miles above the mouth, and I am informed that this steamer reached the mouth of the Chena river and ascended that stream. This is the second steamer which has navigated the Tanana."

The mouth of the Chena river (not "Chenoa") is about 200 miles above the mouth of the Tanana, and not 300 miles, as stated in the article. The Bates Rapids proper are 100 miles above the mouth of the Chena. The Tanana is the second in size of the tributaries of the Yukon.

As the proposed Trans-Alaskan Railway route from Valdes to Yukon crosses the Tanana, the navigation of this river is of great importance. This railway would cross the Tanana near the so-called Forty-mile trail, about 500 miles from its mouth, where the river could easily be bridged. The connection at this point with steamers running up and down the river would give access to almost the entire Tanana Basin. This basin has an area of nearly 25,000 square miles, and includes good grass lands, some rich placers, and probably important copper deposits.

ALFRED H. BROOKS,
Geologist, U. S. Geological Survey.

Washington, Feb. 25, 1902.

Clayton Air Compressors.

Sir: The Clayton Air Compressor Works have noticed in several papers a statement made that would lead their customers to infer that they had sold out and discontinued business. This statement was in no way authorized by us and should not have been published, as it is misleading in every way. The Clayton Air Compressor Works have made no changes that will in any way alter their business relations with their various customers. With new capital they are enlarging their works, increasing their patterns, sizes and styles, and expect, not only to serve their customers better than in the past, but to give them an advantage in the way of prices on improved machinery and new designs.

F. H. JONES, Manager.

New York, March 1, 1902.

QUESTIONS AND ANSWERS.

(Queries should relate to matters within our special province, such as mining, metallurgy, chemistry, geology, etc.; preference will be given to topics which seem to be of interest to others besides the inquirer. We cannot give professional advice, which should be obtained from a consulting expert, or can we give advice about mining companies or mining stock. Brief replies to questions will be welcomed from correspondents. While names will not be published, all inquirers must send their names and addresses. Preferences will, of course, always be given to questions submitted by subscribers.

Books referred to in this column can be obtained from the Book Department of the ENGINEERING AND MINING JOURNAL.

Note.—We find it necessary to repeat that questions sent for this column must in all cases be accompanied by the name and address of the writer. Names, of course, will not be published, but we require them for our own information.

We must also repeat that we cannot publish in this column statements as to the standing of mining companies or the condition and value—or probable value—of mining properties. For such information readers should consult our mining news columns.

Losses of Metals in Smelting.—Will you kindly state what are the losses in smelting ores, in silver, lead, gold and copper? I refer to losses in actual practice in modern plants with the best appliances. —L. L. L.

Answer.—For reasons that you will doubtless appreciate, it is very difficult to get exact data on this point. Metallurgists admit that there are losses, but are very seldom willing to go into details or to state the exact amount. Some interesting data on losses in smelting were given by Mr. Malvern W. Iles in a series of papers published in the ENGINEERING AND MINING JOURNAL, September 9, September 16 and September 23, 1899. These articles referred to the causes of the losses, as well as their amount.

Smelting with Oil.—Could not coke and blast or atomized oil and blast be more economically used to heat a Faber-du-Faur or Tatham furnace than coke alone?—H. H.

Answer.—With regard to the previous answer to this question, which was published in the ENGINEERING AND MINING JOURNAL, February 22, Mr. Franklin W. Smith writes us as follows: "I note in the JOURNAL of February 22 an inquiry by H. H. as to the use of oil and blast for the Faber-du-Faur and Tatham furnaces. The former is, I believe, the retort

furnace used at the Omaha & Grant Refinery, at Omaha, for the volatilizing of zinc crusts. It is mounted on trunnions. The Tatham furnace is used for the same purpose but is not movable. I am reliably informed that atomized oil is used as fuel for the Faber-du-Faur, both at Omaha and at the smelter at Argentine, Kansas. The furnace has one or two tuyeres, one on each side, I think; each with a burner."

Lepidolite.—I have received knowledge regarding the location of a lepidolite mine in the vicinity of Ottawa, which shows by an analysis made by the Geological Survey of Canada, a percentage of 5.44 of lithia. Will you please give me any information you can in regard to the demand for this product, and also if possible place me in communication with some of the leading dealers in this commodity. —A. McL.

Answer.—The principal use for lithium is in the salts of the metal, which are consumed in the preparation of artificial mineral waters, which are used extensively for medicinal purposes. Some lithia waters occur as natural springs, but probably most of those that are sold are artificial. The newest form in which lithia is used is in effervescent lithia tablets. You will find the subject quite liberally treated in Volume VIII of the *Mineral Industry* and in the United States Geological Survey's report on the *Mineral Resources* of the United States for 1900.

The following firms are purchasers of lithia minerals: Smith, Klein & French Co., Philadelphia, Pa.; W. J. Schieffelin & Co., 170 William street, New York; Roessler & Hasslacher Chemical Co., 100 William street, New York, and Wyeth & Brothers, Philadelphia, Pa.

A SAFETY APPLIANCE FOR HOISTING ENGINES

The accompanying illustration shows a safety device for mine hoisting engines, devised by Herr Schlüter, and described as follows in a recent issue of the London *Colliery Guardian*:

The arrangement of most of the ordinary safety appliances in use with winding engines in such that a certain amount of pressure has to be overcome by the governors before the stopping gear is released; and, moreover, the possibility is afforded of the cage exceeding the permissible velocity before the apparatus comes into action, so that one of the chief purposes of such appliances—the slowing down of the cage as it approaches the bank—is not effected. These defects are claimed to be obviated by the Schlüter apparatus, by the following dispositions:

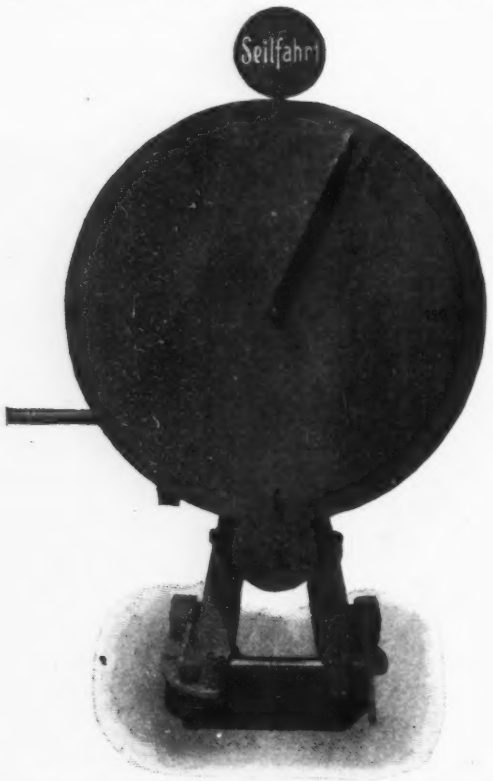


FIG. 1. FRONT VIEW. SAFETY DEVICE FOR HOISTING ENGINES.

A horizontal governor moves a collar along a fixed guide rod, the said collar being also capable of making a more or less complete movement of rotation around its own longitudinal axis. A pulley disk, forming a support for the pawl of the releasing gear, is fixed to the said collar in such a manner as to be adjustable according to the maximum velocity at which the winding is to be performed, which being exceeded, the gear releasing the brake and cutting off the steam is to come into action. In the event of the cage approaching bank or the bottom of the shaft at an excessive speed, or should overwinding occur, the collar of the apparatus is caused to rotate by the action of a lateral hook on the pendulum. This latter carries a roller, which makes contact with one of two wedges adjustably mounted on the rear face of the depth-indicator disk, and forming part of a spiral surface; their length corresponds to a given distance (from 25 to 75 meters), and their height is measured according to the adjustment of the collar. As the cage approaches the bank the roller, and therefore also the pendulum lever, is turned sideways by one of the wedges, and brings the prolongation of the pendulum lever underneath a sloping surface attached to the side of the collar, thus lifting the attached arm and turning the collar. By this means the upper edge of a slide

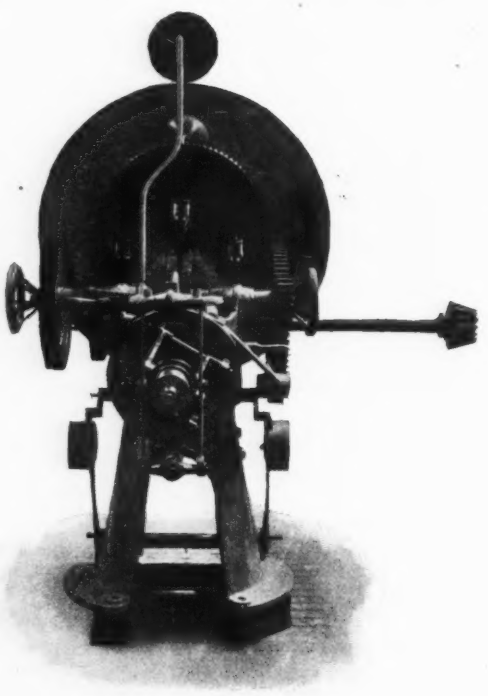


FIG. 2. BACK VIEW.

is drawn aside from under the check pawl, which thereby loses its support and releases a weight which, in its fall, actuates the slide of the steam or pneumatic brake and the steam throttle valve, and brings the engine to a standstill.

So long as the velocity of the cage proceeds to decrease in the prescribed manner as the mouth of the shaft is approached, the governor draws back the slide in the same proportion as the wedges push forward the roller attached to the pendulum lever; consequently the collar is not rotated unless the cage is overwound. Should the prescribed limit of velocity be exceeded by the cage, during any portion of its traverse—immaterial whether men or goods are being conveyed—the governors push the collar and slide out as far as they will go; the pawl thus loses its support and the weight is released. The governors are actuated by a shaft (driven by the main shaft of the engine) and a pair of worm wheels, the setting of the apparatus for the different velocities in winding men and coal being effected by two sets of pinions corresponding to the several conditions. The ratio between the two worm wheels is such that the governors are run at full speed in either case, the setting of the apparatus for the different winding velocities being effected by sliding the shaft on which the change wheels are mounted.

The disk of the depth-indicator is provided with a scale showing the velocity at which the cage is being raised or lowered. The pointer on the indicator is actuated by a worm and worm wheel, and the latter carries adjustable strikers acting on the bell of the indicator.

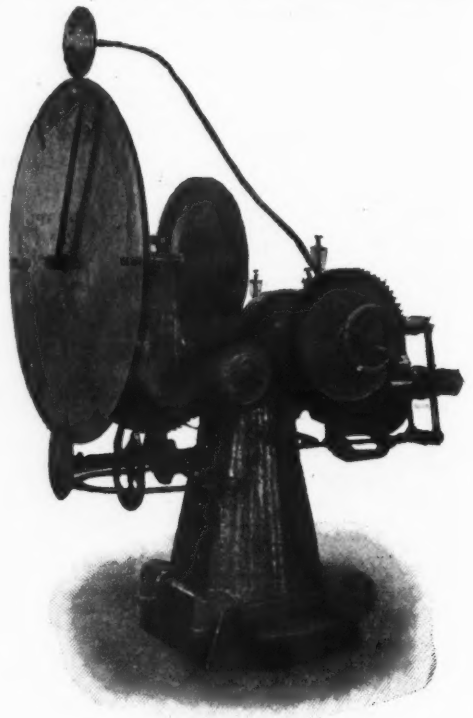
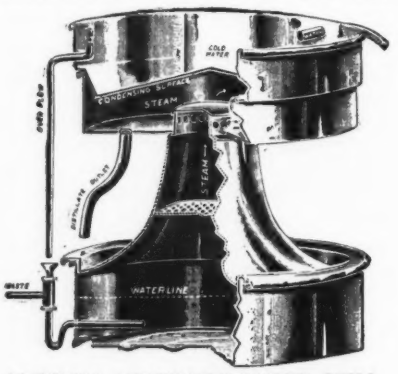


FIG. 3. SIDE VIEW.

A number of these safety appliances are already in use in various German collieries.

THE M'KENNA AUTOMATIC WATER STILL.

The accompanying illustration represents the automatic water still as designed and manufactured by the McKenna Brothers Brass Company of Pittsburg. It is intended for use in chemical laboratories, and also for furnishing pure water for domestic use. To operate the still, it is placed on a tripod over a Bunsen burner or other suitable source of heat. The water inlet in the top pan is connected by rubber tubing to the water supply and water allowed to run in continuously. When the water reaches the level of the holes in the overflow pipe it runs into the funnel shown at the side and then into the lower pan until this is filled to the level of the small waste pipe shown at the side of the tee. The water can-



McKENNA AUTOMATIC WATER STILL.

not rise higher than this level in the lower pan, since the excess of water is carried off by the waste pipe, which is connected by rubber tubing to the sink. When the gas is lighted steam is formed in the lower pan and rises through the central throat into the condensing chamber, passing through the baffle plate shown in the lower part of the throat and entering the condensing chamber through a ring of small holes about ½ inch above the bottom of the condensing chamber. The steam, striking on the upper surface of the chamber, which is kept cool by the running water, is instantly condensed, and drops to the bottom

of the chamber as chemically pure water, whence it runs out through the distillate outlet, which is made of block tin pipe, into a suitable receptacle. As the water boils away from the lower pan, it is automatically replenished, so that the level is kept at the same point and no attention is required.

All parts of the still are easily accessible for examination; by lifting off the top pan and then the condensing chamber, which is made in one piece with the central throat, every part of the still is in plain view.

PATENTS RELATING TO MINING AND METALLURGY.

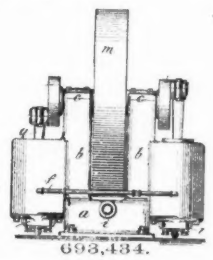
UNITED STATES.

The following is a list of patents relating to mining and metallurgy and kindered subjects, issued by the United States Patent Office. A copy of the specifications of any of these will be mailed by the ENGINEERING AND MINING JOURNAL upon receipt of 25 cents.

Week Ending February 18, 1902.

693,378. TRIPLE SALT AND METHOD OF MAKING SAME.—Emil Courant, Berlin, Germany. A triple salt containing a double cyanide and consisting of a combination of a cyanide of a metal of the alkaline groups with a cyanide of another metal and a salt, other than cyanide, of the said metal of the alkaline groups.

693,381. GUIDING DEVICE FOR TUBE-MILLS.—William Dicks, Beaver Falls, Pa., assignor of one-half to George H. Blaxter, Pittsburg, Pa. In combination with the supporting-bar for the plug or point of a piercing-mill; a bushing slidingly mounted on the bar and provided with a tapered extension adapted to enter the hollow billet and to slide with it along the bar.

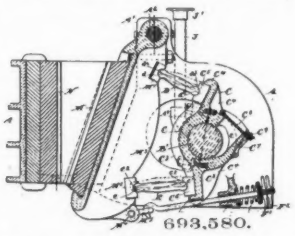


693,434.

693,434. COMPRESSOR.—Frederick W. Parsons, Elmira, N. Y., assignor to Rand Drill Company, New York, N. Y., a corporation of New York. The combination in a compressor with a base, two standards uprising therefrom and having bearings at their upper ends, and two vertical cylinders arranged one on the outside of each of the said standards, the said cylinders, standards, and base being in one integral casting, of a shaft mounted in the said standard-bearings, a fly-wheel secured upon the shaft and arranged between the said bearings, crank-pins carried by the shaft and arranged one on the outside of each of the said standards, pistons in the said cylinders, connecting-rods connecting the said crank-pins with the said pistons, and an inlet and outlet for the fluid acted upon in said cylinders.

693,465. MACHINE FOR DELIVERING COMMINUTED SOLIDS.—Lee Treadwell, Portsmouth, N. H. The combination of a bin, provided with a discharge-orifice, an even-surfaced conveyer movable with relation to the discharge-orifice and placed so near thereto that the surface of the conveyer when in motion retards the normal flow of solids from the bin, a storage-chamber at the side of the discharge-orifice, having a discharge-opening to the conveyer of less normal delivery capacity than the bin-orifice, the storage-chamber being so placed that the conveyer-surface passes under it after leaving the discharge-orifice of the bin.

693,482. METALLURGICAL PROCESS.—Edward G. Acheson, Buffalo, N. Y. A method of reducing ores, which consists in mixing pulverized ore with graphite as the sole conducting and reducing agent, both in a dry state, coating the particles of ore with graphite, and passing an electric current through the mass of such coated particles, thereby heating it to a point sufficient to effect reduction of the ore.

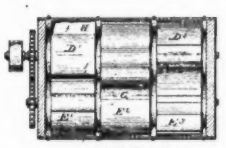


693,580.

693,580. ROCK CRUSHER.—William R. Young, Brooklyn, N. Y. In a rock-crusher, a movable jaw, a shaft and an eccentric thereon, an eccentric-block loosely mounted on the latter, oppositely-extending arms on said block, and thrust-plates extending from said arms to said jaw, all combined.

693,599. LIME-KILN.—William Gleason, South Glens Falls, N. Y. The combination with an angular kiln having a series of radial openings in its corners, a series of injectors projecting into said openings so as to all discharge toward the center of the kiln and means for supplying oil and steam to said injectors.

693,609. ROTARY PUMP OR FORCE-BLAST BLOWER.—Joel Kirkwood, Mauzy, Ind., assignor of one-half to Omar Stevens, New Salem, Ind. A cylinder having segmental cylindrical bores made on two centers, pistons with pockets mounted in pairs in said segmental bores, said bores emptying into chambers at top and bottom common to both having ingress and egress ports, into which chambers all of the pistons enter at each revolution thereof in order to take air or the like from this common chamber below and discharge it into common chamber above, rings or disks partially separating the ends of adjacent pistons and flanges approximating quadrants of circles extending from the inside walls of the cylinder to the rings.



693,609.

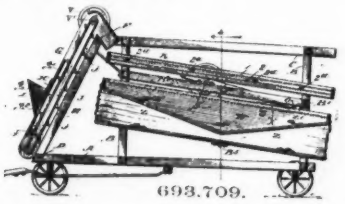
693,635. APPARATUS FOR CONCENTRATING SULPHURIC ACID.—Adolf Zanner, Brussels, Belgium. In an improved apparatus for concentrating sulphuric acid, the combination of a cast-iron vessel, a cast-iron cover on said vessel, inlet and outlet pipes entering said vessel, plates of earthenware completely coating the inner surfaces of the said vessel, cover and pipes, a layer of water-glass and asbestos between said plates and metal surfaces and a plurality of acid-proof cross-walls covering the joints between the plates and having perforations at alternate opposite ends to give the acid a serpentine course within the vessel.

693,678. MACHINE FOR PRODUCING CHLORINE GAS AND CAUSTIC SODA FROM COMMON SALT.—George M. Wilson, Sault Ste. Marie, Canada. In a machine for electrically decomposing common salt into its constituent parts, the combination with a rectangular metal chamber open at the top, and having recesses in its bottom for a portion of the width of the chamber, of an inner cell with non-conducting sides and a carbon cover-plate, a plurality of electrodes protruding therethrough, a paddle-wheel journaled in the sides of the outer chamber in proximity to one end of the outer chamber, suitable means of feeding liquids to the chamber and cell, and means for retaining the same at a certain level.

693,690.

693,690. ORE OR PULP SAMPLER.—Willis G. Dodd, San Francisco, Cal. In a pulp-sampler, the combination with the pulp-accumulating hopper, of the overflow-chamber which receives the pulp discharged from the hopper, a swinging reservoir located at one side of the overflow-chamber, said reservoir having its interior divided into compartments, siphon-outlet for each compartment of the reservoir, a water-supply for alternately delivering water to the respective compartments, a cup or collecting device interposed between the hopper and overflow-chamber, said cup or device being connected with and actuated by the oscillatory movement of the reservoir whereby the same is caused to move at given intervals through the flowing body of pulp as discharged from the hopper.

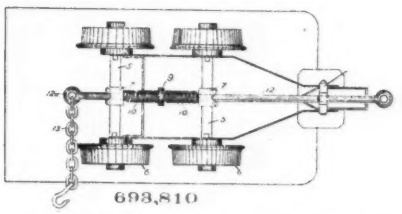
693,703. FERRO-CHROME COLOR AND PROCESS OF MAKING SAME.—Albert Haagen, Cologne, Germany. A process of producing ferro-chromic coloring matters, which consists in bringing into reaction an acid chromium compound of iron and an alkali.



693,709.

693,709. ORE SEPARATING MACHINE.—John C. Hoefer, Portland, Oregon. An ore-separator, comprising in combination with a supporting-frame and a screen-frame shakably mounted on said supporting frame; of a second screen-holding frame shakably mounted on the supporting-frame, independently of the first screen-frame, said second frame having its bottom inclined downward from the opposite ends, a bellows-section under such inclined bottom portion, having valved blast discharges through said bottom, said section having a hinged connection, and means for imparting a simultaneous shaking motion to the screen-frames, and compressing the two bellows-sections.

693,771. FURNACE.—Thomas V. Allis, Bridgeport, Conn., assignor, by mesne assignments, to the International Tin Plate Corporation, a corporation of New Jersey. A furnace adapted to heat packs of plates attached to guiding-strips longer than such packs, consisting of a heating-chamber for such packs and an auxiliary chamber connected with an opening out of said pack-heating chamber and having a reduced vertical sectional area for the accommodation of said guiding-strips.



693,810

693,810. DRAW-BAR FOR ORE CARS.—George E. Truax, Denver, Colo. The combination with the axles and boxes mounted thereon, of a draw-bar slidable in the boxes, a stop on the draw-bar between the axles, and a coil-spring mounted on the draw-bar and interposed between the said stop and each box, the arrangement being such that the car may be pulled by applying power to either extremity of the draw-car.

GREAT BRITAIN.

The following is a list of patents published by the British Patent Office on subjects connected with mining and metallurgy.

Week Ending January 30, 1902.

1,515 of 1901. FUME CONDENSER.—T. G. Webb, Manchester. Apparatus for catching and condensing the fumes given off in the concentration of sulphuric acid.

1,516 of 1901. CONCENTRATING SULPHURIC ACID.—T. G. Webb, Manchester. Improvement in the vessels used in concentrating sulphuric acid, the object being to keep them at a constant temperature.

4,610 of 1901. SULPHURIC ANHYDRIDE MAKING.—Verein Chemische Fabriken, Mannheim, Germany. Improvements in the inventor's process for making sulphuric anhydride, whereby oxides of copper, chrome, etc., may be used instead of ferric oxide.

4,666 of 1901. STEEL MINE PROPS.—G. Fowler, Nottingham. Steel pit props with extra flanges at the ends to prevent the end becoming broken.

5,344 of 1901. CONCENTRATOR.—J. F. Webb, J. E. Lilley and J. Chapman, London. A concentrating table with longitudinal undulating riffles.

18,230 of 1901. TEMPERING STEEL.—W. R. Bennett, New Britain, Conn, U. S. A. Tempering steel, first in water and then in oil, which is gradually brought up to the required temperature.

19,035 of 1901. NICKEL-AMMONIUM SALT.—H. A. Frasch, Hamilton, Ontario. Producing a nickel-ammonium salt by acting on nickel oxide, with salt in the presence of ammonia.

23,124 of 1901. ANHYDROUS CYANIDE OF SODA.—Stassfurter Chemische Fabrik, Stassfurt, Germany. Producing an anhydrous cyanide of soda partially mixed with cyanide of potassium.

Week Ending February 6, 1902.

1,179 of 1901. PICK.—J. O. Davies and W. Davies, Glamorgan. Improved method of fixing miners' picks to handles.

5,015 of 1901. SODIUM BICHROMATE MAKING—F. M. Spence, J. J. Hood and T. J. Craig, Manchester In the manufacture of bichromate of soda from chromate, a process for producing the excess soda in the form of bicarbonate instead of sulphate as at present

5,234 of 1901. SLAG TRATMENT.—S. F. Prest, London, and J. W. Cabot, Johnstown, Pennsylvania. Treating iron slags with acid to recover the oxides of various metals contained in it.

5,312 of 1901. STAMP SHOES AND DIES.—E. Allen & Co., and A. E. Wells, Sheffield. Forming stamp shoes and dies with soft central cores, so that the wear shall be regular and leave rings of actual contact of larger crusning area.

5,440 of 1901. ANTIMONY ORE TREATMENT.—A. S. Plews, London. Process for treating antimonial gold ores by expelling the antimony in a gaseous fuel furnace, first in an oxidizing, and then reducing atmosphere.

8,870 of 1901. VENTILATING TUBES.—A. Zaczek, Mahrisch-Ostrau, Austria. Air tubes for ventilating mines, made of paper pulp, which is easier mended.

9,311 of 1901. FUSE.—F. Render, Manchester. Improved fuse head for electric blasting.

22,314 of 1901. PORTLAND CEMENT MAKING.—C. von Torell, Hamburg, Germany. Machinery for making Portland cement by mixing molten slag with lime.

23,125 of 1901. CYANIDE BRIQUETTES.—Stassfurter Chemische Fabrik, Stassfurt, Germany. Making briquettes of sodium and potassium cyanide.

PERSONALS.

Senator Thomas Kearns, of Utah, has been in New York City.

Mr. Charles R. Fletcher, of Boston, Mass., has been in Prescott, Ariz.

Mr. E. Husted, who is heavily interested in the Guanacevi District, has been in Parral, Mex.

Mr. P. E. Murray has accepted a position as superintendent of the Zubiata Mine, Sonora, Mex.

Mr. Ernest R. Woakes, of the Highland Mining Company, has returned to Nelson, B. C., from England.

Mr. Leo Von Rosenberg, of New York City, has been in Lower California, Mex., examining mining properties.

Mr. F. O. Wilkinson, manager of the Hearst mining properties in the Yellow Pine District, Southern Nevada, has been in Los Angeles, Cal.

Mr. Wm. N. Page, of Ansted, W. Va., has been examining the coal properties of the Amalgamated Copper Company near Bear Creek, Mont.

Mr. Richard Hecksher, one of the principal stockholders of the Clifton Consolidated Copper Mines of Arizona, has been recently at Clifton, Ariz.

Mr. Donald B. Gillis, of Butte, Mont., western representative of Mr. Franklin Farrell, of New Haven, Conn., has been on a visit to Salt Lake, Utah.

Mr. Charles D. Lane, of San Francisco, Cal., principal owner of La Fortuna Mine in Yuma County, Ariz., has been making a trip through Arizona.

Mr. P. E. Van Sann is in charge of the office recently opened by the Colorado Iron Works Company in the Broad Exchange Building, New York City.

Capt. T. Wain Morgan-Draper, of San Francisco, Cal., general manager of the Waldo Copper Mine and other properties, was in Grant's Pass, Ore., recently.

Dr. M. E. Wadsworth, head of the Department of Mines and Mining of Pennsylvania State College, has been elected geologist of the Pennsylvania State Board of Agriculture.

Mr. James Ross, of Montreal, Quebec, a prominent stockholder of the Dominion Coal Company and the Dominion Iron and Steel Company, has gone to England for a month's visit.

Mr. Frank Janney has resigned as superintendent of the Golden Gate Mill at State Line, Utah. He is succeeded by Mr. Fox, who was under Messrs. Janney and Jackling when they were in charge of the mill.

Mr. Hartwig A. Cohen, formerly general manager of the Consolidated Mercur Mine, will, it is stated, take charge of the Ben Harrison and Tom Reed mines in Lincoln County, Nev., for Capt. J. R. De La Mar.

Mr. Paul W. Law, mining expert of Seattle, Wash., has returned from a trip to Alberni, B. C., where he inspected a number of properties, including those of the Pacific Steel Company, the Serita, Copper Island and Sechart.

Mr. J. A. Traylor, who for the past 4 years has been in charge of the mines and mills of the Fernando Mining Company, Durango, Mex., has resigned and accepted the position of superintendent of the Union Copper Company at Salisbury, N. C.

Mr. C. S. Herzig, of New York City, has gone to Virgilina, Va., to inspect the Blue Wing Mine now operated by his company. From there he goes to Knoxville, Tenn., in the vicinity of which place his company is mining both iron ore and barytes.

Mr. A. J. Morse, who designed the cyanide plant and mill of the Exposed Treasure Mine near Mojave, Cal., is now in the assaying and ore treating business in Los Angeles, Cal. He will install a 5-ton cyanide testing plant at his place of business, 608 North Main street.

Messrs. Meares, Walker and Braden, of London, Eng., accompanied by Mr. Butterworth, of New York City, were in Virginia, Va., last week, where they examined the workings of the High Hill Mine, operated by the Virginia Copper Company, of New York City, in which they are large stockholders.

Mr. J. K. Robinson, of Iquique, Chile, who represents the interests of the Westinghouse Electric and Manufacturing Company, Westinghouse, Church, Kerr & Company, and other prominent North American concerns in Chile, Peru, Bolivia, and Eucador, is now on a visit to the United States.

Mr. E. H. Martin, formerly connected with the Diamond State Steel Company, has been appointed metallurgical engineer of the Carnegie Steel Company, Pittsburg, vice Mr. Ambrose Monell, engineer of tests. Mr. Monell has been appointed assistant to President Corey of the Carnegie Steel Company.

Mr. Emil Sartin, of Helsingfors, Finland, has been in Denver, Colo. He is to look over gold, silver, copper, lead and iron mines in Colorado, Utah, California, Wyoming, and Montana, and will inspect granite and stone quarries in Ohio, New Hampshire and Canada. He is making this inspection in behalf of the Government of Finland.

Mr. Benjamin B. Bissell, president of the Lonaconing Coal Company, and for many years agent at Baltimore for the new Central Coal Company, has been elected manager of the Century Coal Company and has taken charge. He entered the service of the new Central Coal Company as a boy and gradually worked up to his present position.

Mr. Edwin Hawley, long and favorably known as the assistant general traffic manager of the Southern Pacific Company, was made the recipient of a valuable testimonial of respect and esteem upon his retirement from the position which he has held with such great success. All of the officials and employees under Mr. Hawley's jurisdiction joined in presenting him with a magnificent punch bowl, with ladle, platter and cups, all of special design and of solid silver. An appropriate inscription thereon was as follows:

"Presented to Edwin Hawley upon his retirement from the office of assistant general traffic manager of the Southern Pacific Company, February 28, 1902, as a testimonial of their admiration and esteem by the representatives and employees under his jurisdiction in New York, Boston, Philadelphia, Syracuse, Baltimore, Washington, Hamburg, London, Liverpool, Rotterdam and Antwerp."

There was no formal ceremony of presentation, but the gift was quietly sent to the apartment of Mr. Hawley, in "The Rutland," New York City, last Friday evening, February 28, and placed upon a table awaiting Mr. Hawley's arrival. Thus it was a complete surprise to him. The next morning, March 1, he called at the offices of the company, and personally, with a great degree of feeling, thanked his former employees. Those participating in this presentation feel that they have honored themselves by honoring Mr. Hawley.

OBITUARY.

F. W. C. Pengilly, formerly manager of the Mikado Mine at Rat Portage, Mich., died in St. Day, Cornwall, Eng., recently. Mr. Pengilly had a severe attack of pneumonia at Rat Portage, from which he never fully recovered and after a year in Spain returned to Cornwall. Mr. Pengilly came of one of the oldest Cornish families the members of which for generations have been mining men. He was born in Chacewater, Cornwall, in 1861, and after an adventurous career in many parts of the world, was attracted to South Africa, where he erected the first successful direct cyaniding plant at Kleinfontein. He was a member of the American and Canadian Institutes of Mining Engineers and also of the Institute of Mining and Metallurgy of Great Britain. He was a resourceful, practical man, and his death is a distinct loss to mining and metallurgy.

SOCIETIES AND TECHNICAL SCHOOLS.

LEHIGH UNIVERSITY.—A circular sent out by this institution at South Bethlehem, Pa., announces that 5 scholarships will be open for competition at the June examinations for students in civil engineering, mechanical engineering, electrical engineering, mining and metallurgy and chemistry. The scholarships are of $150 each. All fees are remitted to holders of such scholarships except laboratory charges. Examinations must be taken at South Bethlehem.

LAKE SUPERIOR MINING INSTITUTE.—The regular meeting of the Institute for 1902 will be held on the Minnesota Ranges, beginning August 19. This date has been selected by the council to afford an opportunity of visiting the mines while in operation. The last meeting held on these ranges was in March, 1895, at which time the open pit mines were closed down.

It is earnestly desired that a number of papers be presented at this meeting, and in order that intelligent discussion may be had on the subjects presented the council has decided that papers be printed and distributed some time before the meeting.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—There have recently been added to the library in the clubhouse at 12 West Thirty-first street, New York City, a number of interesting works. The library contains one of the best collections of engineering literature in the city, and is especially rich in files of the proceedings of the technical societies of this and other countries, and journals published both in the United States and abroad. There is also a valuable collection of historical books bearing on mechanical and scientific subjects, which is useful in research work. New books are added as they appear, and important articles in the current files of the engineering papers are indexed in the card catalogue so as to make them immediately available. The library is open to the public between the hours of 10 A. M. and 10 P. M., and offers to those interested in engineering a pleasant and convenient spot for reading and study.

INDUSTRIAL NOTES.

The Chicago Pneumatic Tool Company has secured a Mexican contract for some 20 pneumatic tools, boiler, air compressor, etc, to be utilized for bridge work on the Tehuantepec Railway.

The Federal Lead Company has placed an order with the Robins Belt Conveying Company, of New York City, for a conveying system for distributing ore among the various departments of the plant.

The Heine Safety Boiler Company, of St. Louis, Mo., recently received a contract through its New York City office for 3 200-h. p. and 3 250-h. p. boilers for installation in a South Australian electrical power plant.

The California Tool Company, of Los Angeles, Cal., was recently incorporated with $20,000 capital to manufacture oil-well supplies. J. A. Richardson, F. C. Richardson, M. A. Anderson and N. and A. Wauldie are the incorporators.

The Goubert Manufacturing Company, of New York City, has ben awarded a contract for feedwater heater equipment for the new plant at Trafford Park, near Manchester, of the British Westinghouse Electric and Manufacturing Company.

The proprietors of the Baldwin Locomotive Works, Philadelphia, Pa., celebrated the 70th anniversary of the founding of the works and the completion of the 20,000th locomotive on February 27th, by a dinner given at the Union League Club at which 250 men were guests.

John A. Mead & Co., of Rutland, Vt., have secured a contract from the engineering firm of Kerkoven & Mazel, Tjibadak, Dutch East Indies, for a quantity of conveying machinery. The Mead Cimpany has also received an order for an automatic railway, to be used for handling coal in an electric plant at Milan, Italy.

The Atlas Pipe Wrench Company, of New York and San Francisco, reports an increasing demand for the Atlas pipe wrench. Another specialty is the Atlas tube cleaner. The Oxnard Beet Sugar Refinery, of Oxnard, Neb., recently ordered 4 of these cleaners for cleaning water tube boilers after having tried one for some time.

The Burns Fire Brick Company, of Williamsport, Pa., intends building a dust plant near Lock Haven, in the spring and is receiving bids for 3 9-ft. clay grinding pans, etc. It is the intention of the company to build an 8-mile standard gauge railroad from Lock Haven to its mines in the Scottac District. The Williamsport brick plant will also be enlarged. Another pan and a boiler and engine will be purchased.

The Westinghouse Electric and Manufacturing Company, of Pittsburg, Pa., is delivering to the Manhattan Elevated Railroad in New York City the largest electris generators ever made. Each will have 8,000 h. p., and with each is a pair of 12,000-h. p. Allis-Chalmers Corliss engines. The shafts are hollow, of Bethlehem nickel steel 37 in. in diameter in the center and 34 in. in the bearing, with a 16 in. bore. Each shaft weighs over 60,000 lbs.

The Commonwealth Steel Company, of St. Louis, Mo., has elected the following officers: James Hopkins, president; William F. Niedringhaus, first vice-president; J. S. Andrews, second vice-president; Louis J. Hayward, treasurer; O. S. Pulliam, secretary and general manager, and Charles T. Westlake, works manager. The company states it will build the largest steel foundry in the United States, on the east side of the Mississippi River, opposite St. Louis.

Bird S. Coler, of New York City, has been chosen president of the Medina Quarry Company, organized to control the stone quarry properties on the Erie Canal near Buffalo. The headquarters of the new concern will be at Albion, N. Y., with branches at Buffalo and New York City. The following directors and officers have been chosen: James A. Roberts, vice-president; L. A. DeGraff, general manager; W. E. Scarritt, treasurer, and J. C. Rogerson, secretary.

The Sharon Foundry Company has organized with a capital of $250,000, and will build a large foundry between South Sharon and Wheatland, Pa. Robert Bentley, W. J. and Frank Hitchcock, pig iron manufacturers in the Mahoning Valley, are interested. The new concern will manufacture blast furnace and rolling mill machinery, ingot molds and iron and steel castings. The officers are Joseph Riddell, president, and Thomas Kennedy, secretary and treasurer.

The Buffalo Forge Company, of Buffalo, N. Y., is building a large fan to be used for mine ventilation by the Modoc Coal Mining Company, of Gloster, O. This fan has a 250-in. housing of the three-quarter type, and is constructed throughout of steel plate stiffened and braced. The blast wheel is of special design. It is to be driven by a direct-connected horizontal engine at about 150 revolutions per minute. The fan will deliver 125,000 cu. ft. of air per minute at ordinary working speed.

The Liberty Manufacturing Company, of Pittsburg, reports a wonderful increase in recent sales of the Chicago boiler cleaner. In addition to its regular trade, one firm has ordered 42 cleaners; another 100; another 180, and one company has placed an order for 500 cleaners for use during the current year. The Liberty Manufacturing Company also reports heavy

sales for the Famous oil filter and refiner. This the firm claims is owing to the fact that the filter sells for a low price and because it is sent on approval or to be used in competition with any other make.

The Marine Iron Works, of Chicago, Ill., has nearly completed its new plant on the north branch of the Chicago River. The machine shops and other buildings will be equipped in accord with the best modern practice. The tools in the machine shops are arranged in separate groups so that each piece of work can be handled to completion in its own particular section. Each of these groups is to be driven by a separate motor, supplied with current from a central dynamo service. There will also be a pipe shop and a department for water tube boilers. But little has been done yet about arranging the yard and boat sheds.

The Crocker-Wheeler Company, of Ampere, N. J., states that recent orders for its engine type generators have again given assurance of the high regard in which these machines are held by manufacturers. The following companies have recently placed orders for these machines: Pittsburg Reduction Company, New Kensington, Pa., 1 size 224, 200 kw.; National Mining Company, Sygan, Pa., 2 size 224, 200 kw.; Lake Shore & Michigan Southern Railroad, Collinwood Shops, O., 1 size 336, 400 kw.; Federal Lead Company, Alton, Ill., 2 size 224, 150 kw.; Harrisburg Pipe and Pipe Bending Company, Harrisburg, Pa., 1 size 224, 200 kw.; American Bridge Company, New York, 1 size 280, 300 kw.; Allis-Chalmers Company, Milwaukee, Wis., 1 size 336, 300 kw.; Hall of Records, New York, 2 size 252, 150 kw.; 1 size 224, 100 kw.; 1 size 67, 50 kw.

The Penman Tank and Boiler Works, of East Chicago, Ind., is arranging to remove its business to Beaumont, Tex. The works have for the past 6 months been running on contracts for tanks for the Beaumont oil district. A charter has been secured under Texas laws for the incorporation of the Penman Steel and Iron Works, with an authorized capital stock of $125,000. Twenty acres of land have been purchased in the northern part of Beaumont. The works are to comprise a boiler shop, tank shop, stock house and the neecssary offices, and will have railroad connections and water transportation. The stock of the new company will be owned by W. H. Penman, of East Chicago; H. Staiti and Beaumont men. W. H. Penman is manager of the business at East Chicago, and will continue in that capacity with the new corporation. The works at Beaumont will be in operation some time during the current year.

The International Steam Pump Company has determined the general plan of its new works at Harrison, N. J. The buildings will be so grouped that future extensions can be made without disturbing the general system of arrangement. There will be a main machine shop, 125 ft. by 1,000 ft. Parallel with it and 150 ft. distant there will be the erecting shop, 125 ft. by 600 ft. Both these buildings will contain a gallery on either side of the center span. Between these buildings and connecting them is to be the erecting shop, which will be about 120 ft. high, 110 ft. long and 150 ft. wide. The main foundry for heavy work will be 140 ft. by 600 ft. and will contain 2 cupolas. The machine foundry, will be 60 ft. by 600 ft. and will contain one cupola. The pattern shop will be 75 by 150 ft. and the pattern storage warehouse 75 by 450 ft. and probably 6 stories high. There will be another warehouse, 43 by 200 ft. The testing department and shipping departments will be confined to a building 75 by 400 ft. The engine and pump house will be 65 by 175 ft., and the boiler house, 50 by 175 ft. The office and drafting room, 75 by 150 ft., will be at the extreme north end of the works. Purchases of equipment have not yet been made.

The Pan-American Exposition, having passed into history, the disposition of the buildings and fixtures demanded the attention of the directors. While the exposition was not constructed on as extensive a scale as some of its predecessors, it contained a large amount of material. Over 33,000,000 ft. of lumber was used, 40,000 sq. ft. of windows, 22,000 sq. ft. of doors, 2,000,000 lbs. of pipe, 2,000,000 lbs. of structural iron, thousands of brick, 1,000,000 ft. of wire, 600,000 sq. ft. of roofing tile, 200,000 incandescent lights, 25 high speed automatic engines, 19 large steam boilers. These and numerous other similar items will give some idea of the quantities of building material and supplies it is necessary to use in constructing such an exposition. Not quite $9,000,000 was expended. There are few contractors in a position to undertake the demolition of such an institution. The Chicago House Wrecking Company was practically the only bidder and the contract was awarded to it. The purchase price is understood to have been something like $132,000. The Chicago House Wrecking Company was organized in 1892 for the purpose of dismantling the World's Fair of Chicago. It was a gigantic undertaking and the fact that the exposition cost over $33,000,000, will convey some idea as to the extent of it. This company also purchased the Trans-Mississippi Exposition of Omaha and the Chicago Postoffice and Sub-treasury Building. The company's method of disposing of wrecked material consists of publishing a catalogue containing all of the vast number of items used in constructing the exposition. The material is carefully listed and all put in first-class shape for further use.

TRADE CATALOGUES.

A little 10-page circular issued by the Power Specialty Company, of Buffalo, N. Y., gives a large number of testimonials from users of the Dean steam tube cleaner for water tube boilers.

Bulletin No. 100, a 16-page pamphlet published by the Racine Hardware Company, of Racine, Wis., describes the direct-connected generating units manufactured by the company. These units are Racine vertical automatic engines connected to well-known generators and are recommended for lighting, storage battery and power service. The company's engines are made in sizes from 2 to 37 h. p., and the units are stated to be of neat and compact design.

The American Enginering Works, of Chicago, Ill., states that it is organizing a new system of trade publications consisting of a series of 4 by 6½ in. cards and booklets intended to cover all points of mine, mill and smelter supply. It is expected that the number of these cards will reach 2,000 and proper arrangements will be made so that they can be kept for reference on a card catalogue system which will be of convenience to purchasing agents of mining companies. A complement of this advertising system will be a series of cards of technical information covering plants and prices and other useful data, upon a subscription basis.

"Core Drilling Without Diamonds" is the title of a neat 32-page pamphlet published by the Davis Calyx Drill Company, of New York City. This pamphlet calls attention to the advance in the price of diamonds within the past 5 years and a consequent increase in the cost of running diamond drills and points out the remarkable work done on the hardest rocks by drills using cutters of chilled iron shot. In the company's drills as now sold, the company advises the use of the Davis toothed cutter for soft rocks and of the chilled shot bits for harder formations. The drills are made in a number of sizes and may be driven by a horse power, or a gas or steam engine.

The American Schools of Correspondence, of Boston, Mass., calls attention to the facilities for home study that it offers industrious and ambitious young men. In its "Handbook," a pamphlet of 100 pages, the advantages of the school are fully set forth and the various courses of study are described. The school offers courses in electrical, mechanical, stationary, marine, locomotive and textile engineering, also in heating, ventilating and plumbing. The school also offers special courses in arithmetic, elementary and advanced algebra, geometry, mechanical drawing, elementary chemistry and metallurgy, chemistry and dyeing, heating and ventilation, electric power and lighting, and other subjects.

Catalogue No. 7, issued by the Allis-Chalmers Company, Fraser & Chalmers Works, Chicago, Ill., treats of perforated metal for mining screens of any kind, needle-slot screens for stamp mills, screens and screen material for ore dressing plants, etc. The company states that it considers perforated metal far superior to wire cloth in respect to strength, durability and uniformity of mesh. The Fraser & Chalmers Works manufacture trommels, conical revolving screens, hexagonal screens, improved standard revolving screens for stone quarries, etc. The company states that it has equipped its plant with the latest improved machinery and considers itself ready to meet all demands for perforated metal promptly.

The Yoch improved coal mining machine is described in a 20-page pamphlet published by the Belleville Pump and Skein Works of Belleville, Ill. This machine is of the pick type and uses compressed air. The company states that it has acquired all the patent rights for the United States and foreign countries for the manufacture and sale of the machine and that it has executed all the Yoch Mining Company's improvements and manufacturing since 1882. The construction and appearance of the machine have been radically changed and the manufacturers now claim for it these merits: Excellence of material and workmanship; interchangeable parts; weigh enough to allow high pressure behind the piston, insuring a vigorous blow; a piston cushioned on air doing away with metallic or leather buffers; packing easily accessible and an adjustable center permitting the machine to be balanced for different lengths of picks. The manufacturers also state the machine will undercut 6 ft. without too much jarring on the operator and that they will undertake to work the machine in any room or entry where any other machine can be worked. The Belleville Pump and Skein Works also manufacture the Smith double rotary air drill, mine fans, coal mine cars, chilled car wheels, screens, etc.

GENERAL MINING NEWS.

Petroleum Development in February.—There were 880 wells completed in the Appalachian and Trenton oil fields in February, including 176 that were nonproductive of oil, and the new production was 9,082 bbls. These are the smallest figures recorded in several years, says the Oil City *Derrick*. Compared with January, this is a decline of 238 wells, 3,215 bbls. production and 51 dry holes. In the Pennsylvania and Trenton Rock oil fields, 1,018 wells were completed in January, 227 were in the list of dry holes and the new production amounted to 12,297 bbls. A gain of 40 in wells completed and 36 in dry holes was accompanied by a loss of 345 bbls. in new production. On February 28, the count of field operations showed 530 rigs and 978 wells under way in the Eastern and Western oil districts. This is a gain of 14 rigs, accompanied by a loss of 100 wells drilling, making a net loss of 86 from the figures of last month. On January 31 the count showed 516 rigs and 1,078 wells drilling in the Eastern and Western oil fields.

ALABAMA.

(From Our Special Correspondent.)

Coal Production.—State Mine Inspector J. deB. Hooper has completed his report showing the production of coal in 1901. The grand totals are as follows: Miners employed, 10,324; inside day men, 2,558; outside day men, 1,502; total men employed, 14,294; production—lump coal, 482,016 tons; nut, 82,271; slack, 130,408; run-of-mine, 7,578,567 tons; total production, 8,949,717 tons. In 1900 the production amounted to 8,273,362 tons. The production by counties was as follows:

County.	Tons.	County.	Tons.
Bibb	1,271,673	Shelby	172,054
Blount	143,583	St. Clair	82,207
Etowah	74,544	Tuskaloosa	387,356
Jefferson	5,379,074	Walker	1,373,776
Marion	54,485	Winston	10,965
Total			8,949,717

ARIZONA.

COCHISE COUNTY.

Copper Queen.—Officials of this company confirm the statement that the smelting plant is to be removed from Bisbee to Douglass, 25 miles southeast, near the Mexican border on the railroad from Nacosari. This railroad, now under construction by Phelps, Dodge & Company, is now completed to Deming, N. M., and will ultimately enter El Paso. The company is to move its smelter to Douglass to secure greater economy in reduction costs. It is cheaper to haul the ore down hill by large cars and heavy train loads than to haul coal up hill to Bisbee over 2 per cent grades. The coal supply will come from Colorado as now. Again on the new site the company expects to have an abundant water supply, whereas a shortage of water has hindered smelting at Bisbee for several months past. A third reason for the change is that the Bisbee works were originally designed for treating oxidized ores. The company now is treating sulphide ores in great quantity and has a large bessemerizing plant; the changes in treatment brought about by changes in the ores led to additions being made to the original works as needed and the final result is an efficient but ill-arranged plant. At Douglass the company will arrange the various departments so that the cost of handling material will be reduced to a minimum. It is stated that the company does not expect to increase the present capacity of its plant materially and that the plans for the new works are not yet completed. The change from Bisbee to Douglass will be made gradually.

MOHAVE COUNTY.

(From Our Special Correspondent.)

Badger.—The last shipment of ore did not meet expectations and the leasers, Messrs. Van Marten, Prison, Cooper & Cooledge surrendered the mine and its new equipments to the owner, Tom Chadwick.

Century.—The owners of this mine, Hughes & Mitchell, of Chloride, have completed a pack trail down the mountain and will soon make a carload shipment of horn silver ore.

Elkhart.—Theo. B. Comstock is soon to return from California and assume the management of the mine and mill, when work will be resumed.

Empire.—Thompson & Beecher, of Kingman, will soon start work on this property.

Gold Roads.—Prospectors are flocking to this new district near the Colorado River. Buildings are going up fast.

Minnesota.—The new mill is turning out 100 tons of concentrates daily. The new water supply is abundant and things are moving smoothly.

Pinkham.—After a short stoppage, during which some changes were made in the management, this Chloride mine is again hoisting ore. A sale of this property to a Los Angeles company has not been consummated.

Redemption.—This mine, belonging to Robert J. Ferguson, of Kingman, is soon to be worked by a new

company under bond and lease. The mine has a 2-ft. vein of copper-gold-silver ore in the 70-ft. tunnel.

Silver Age.—F. W. Theis is to begin work again.

Sunrise.—This Chloride property will install a new 100-ton concentrating plant as soon as practicable. D. W. Aaron has been appointed general manager by John Barry, the owner.

Tennessee.—This mine and mill are about to start work again. Good ore is reported opened on the north 500-ft. level.

CALIFORNIA.

AMADOR COUNTY.

(*From Our Special Correspondent.*)

Kennedy.—The controversy about the Clyde Mine, owned by this company at Jackson, J. F. Parks, superintendent, has been settled after having been in the Land Office since 1873, and the entry money for patent has been accepted. The cause of delay was a conflict betwen placer and quartz claimants.

CALAVERAS COUNTY.

(*From Our Special Correspondent.*)

Angels Quartz Mining Company.—On its property, at Angels, the company is preparing to erect a 60-stamp mill. Rich ore is coming from the mine, which belongs to James V. Coleman, of San Francisco.

Lone Star.—A hoist has been put in and the mine will soon be in operation.

Melones Consolidated.—The mill will be ready to drop 60 stamps and crush ore within 3 weeks. Ore will be taken from the open cut at the crest of Carson Hill and dropped through 2 raises 1,100 ft. to the tunnel, through which it is conveyed to the mill. A Victor turbine wheel under a head of 68 ft., will give 600 h. p., sufficient to operate 120 stamps, compressor, generator, etc.

Utica.—This property, at Angels, owned by Hayward, Lane and the Hobart estate, has been for some years the largest gold producer in California. The 60-stamp mill reduces 300 tons a day. The hoist, sawmill and tramway are run by water power, and the mill, machine shop, etc., are run by electric power. The company has a very extensive ditch system.

ELDORADO COUNTY.

(*From Our Special Correspondent.*)

Cambrian.—At this copper mine, near Lotus, Leonard Thomas, general manager, machinery to run air drills is being put in.

Gold Bug.—This property, at Georgetown, is owned by a Cleveland, O., company and is managed by W. E. Thorne. The hydraulic elevator has started.

Julian.—This property at Pilot Hill, which has long been idle, is being reopened by W. A. Freeman and others, of Auburn.

Little Emma.—At this copper mine, near Pilot Hill, miners are taking out ore which is shipped to the Copper King Smelter at Sea Bluff Landing.

River Hill.—This company is now running the old Gentle Annie Mine, near Placerville; George M. Clark is superintendent. Having plenty of water, the mine is running full force and the mill is crushing 80 tons a day.

Toll House.—This mine has been purchased at sheriff's sale by a Mr. Perkins, of Cleveland, O., one of the large stockholders. There is a 20-stamp mill and other machinery on the property.

HUMBOLDT COUNTY.

(*From an Occasional Correspondent.*)

Beach Sand Mines.—Since the purchase of the Old Bluff ocean beach black-sand deposits by a large company determined to work the property extensively, there is considerable activity all along the Humboldt coast. New gold-saving appliances have been sent up to G. J. Root for the Big Lagoon deposits. Ten acres at Little River have been sold to San Francisco men by William Beach, and other contracts or bonds have been made on tracts of black-sand. The gold is very fine and very difficult to save. A great many varieties of amalgamating machines have been tried, but the Oregon or California "Tom" appears to have succeeded best. These are not patented appliances, and any one may make and use them. Most inventors of gold-saving appliances in California try their hands on these auriferous beach sands, but have had little success.

Gold Bluff Mining and Lumbering Company.—Mr. Bell says his company intends at once to prosecute beach sand mining at Gold Bluff.

INYO COUNTY.

(*From Our Special Correspondent.*)

Anthony.—This old mine is being put in order and operations will be resumed in the spring.

Millspaugh.—A mill to crush 20 tons of ore per day is ready for work.

KERN COUNTY.

(*From Our Special Correspondent.*)

Butte Lode Mining Company.—Suit has been brought against this company for a certain tract of land, including the Philadelphia Mine. The Graniss Land Company is claimant.

Exposed Treasure.—This mine, on the desert at Mohave, W. J. Nelson superintendent, continues to yield well. A 20-stamp mill is being put up.

Karma.—This mine, 4 miles from Mohave, Thomas J. Durand superintendent, continues to ship good ore to the Selby Smelting Works. The shaft is only 175 ft. deep, but considerable gold has already been taken out. A number of other claims around Mohave are being opened.

Keyes.—This old mine, near Havilah, has been sold.

Oshkosh Mining Company.—A mill is being installed on this property in the Piute Mountains 40 miles north of Mohave and 30 miles west of Randsburg. This is a Los Angeles concern recently organized by G. P. Drew, R. E. Doan and others. The claims are being prospected.

Rex.—This prospect, near the Karma, at Mohave, has been sold to Boyle & Thompson, who have a force of men at work.

MADERA COUNTY.

(*From Our Special Correspondent.*)

Gambetta.—This mine, at Grub Gulch, which closed in September, 1900, and has since been idle, has now been sold and is being pumped out.

Josephine.—This property, at one time a large producer, has been sold by the Risdon Iron Works, of San Francisco, and is being pumped out. It is at Grub Gulch.

Rex.—This mine, at Grub Gulch, C. M. Ward, superintendent, has a 2-stamp mill which at present is crushing very high grade ore.

MARIPOSA COUNTY.

(*From Our Special Correspondent.*)

Blue Lead.—On this mine, near Hornitos, 30 men are employed. The name has been changed to Organette. The largest owner is a Mr. Harris, of an Eastern organ manufacturing company.

Hite.—It is reported that this famous old mine, at Hites Cove, owned by Capt. A. H. Ward, of San Francisco, has been sold.

Mariposa Commercial and Mining Company.—The mines of this company are at Mt. Bullion and C. C. Derby is superintendent. The company is building a very extensive electric power plant, machinery for which is being received rapidly. The company owns the Mariposa Grant and is running 2 quartz mills, one at Princeton and the other at Mariposa.

MONO COUNTY.

(*From Our Special Correspondent.*)

Crystal Lake.—At the mines of this company near Lundy, R. T. Pierce, superintendent, there are 80 men employed. Work is progressing rapidly on the big tunnel.

Galeta Consolidated.—This company, with mines at Jordan, has elected the following directors: J. F. Tichenor, George H. Folsom, G. H. Kellogg, Leander Shores, James A. Alexander, M. R. Cook and D. M. Kent The latter is secretary, with offices at 330 Pine street, San Francisco. Mr. Tichenor is president and E. R. Grant is the New York transfer agent. The executive committee in New York City is composed of J. F. Tichenor, James A. Alexander and M. F. Cook.

South End Tailings Company.—This company, at Bodie, has its custom mill nearly completed.

Standard Consolidated Mining Company.—This company, which owns a number of mines at Bodie, has elected the following officers for the coming year: Directors, P. N. Lilienthal, C. E. Paxton, William H. Metson, Sol E. Scheeline and John W. Pew, all of San Francisco, and W. H. Oscanyon and N. Wertheimer, of New York. Mr. Oscanyon is president, Mr. Lilienthal, first vice-president, and Mr. Wertheimer second vice-president. J. W. Pew, 310 Sansome street, San Francisco, is secretary, R. G. Brown, general manager, and R. C. Turner is local superintendent. The Anglo-Californian Bank is treasurer. R. S. Grant, Theo. C. Camp and Sigmund Cohn form an advisory committee of stockholders residing in New York City. During the past fiscal year the company has paid 4 dividends aggregating $71,357 and has expended $56,584 in buying mining ground at or near Bodie. The company has a cash balance of $14,305 in its treasury besides $104,735 invested in United States bonds. The company has 85 miners at work.

Syndicate.—This mine, near Bodie, is worked by a small force.

NEVADA COUNTY.

(*From Our Special Correspondent.*)

Sierra Queen.—This mine, formerly the Stiles, at Nevada City, is being repaired. W. H. Martin is superintendent.

Union Blue Gravel.—At this mine, near North Bloomfield, 30 men are running a 5,000-ft. tunnel.

Waller & Mulling.—A new plant has been put on this mine, near Nevada City, to replace that burned a short time since. William Climo & Co., who are operating the property, have pumped it out.

Yuba.—Tests are being made of ore from this mine, at Maybert, and work may be started by H. E. Averill, R. D. Jacsson and D. R. Finlayson.

PLACER COUNTY.

(*From Our Special Correspondent.*)

Daniel Webster.—Considerable work is being done on this quartz mine, near Michigan Bluff. The shaft is now down 125 ft.

Dardanelles.—The pipe is laid and giants are in place to work this mine, near Forest Hill.

Paragon.—This mine, at Bath, is ready to hydraulic. This is the old Breece & Wheeler Mine, which is worked both by drifting and by hydraulicing.

SAN BERNARDINO COUNTY.

(*From Our Special Correspondent.*)

Capital.—Very rich rock is coming out of the Capital Mine at Dale. Some gold is saved by running it through a dry-washer and some is pounded up and washed in pans. The ore streak is very high grade. The mine is owned by C. B. Eaton, of Los Angeles, and has created quite an excitement at Dale.

Davis Mining and Smelting Company.—This company, at Oro Grande, is to have an 80-ton smelter, as the ore is of a grade which will not bear shipment. The Los Angeles company owns 12 locations.

Planet.—This mine, in the Monumental District, is about to be opened on a large scale. Two large steam hoists are being installed.

SAN LUIS OBISPO COUNTY.

(*From Our Special Correspondent.*)

Josephine.—The Paso Robles Company is reported to have bought this old quicksilver mine at Klau, and will work it.

Karl.—This quicksilver mine, at Karl, is turning out about 8 flasks daily.

Madrone Mining Company.—N. J. Downer has organized this company to work the Ladner quicksilver mine at Templeton.

Ocean View.—At this mine, in Pine Mountain District, some very rich ore has been uncovered. This is a quicksilver region.

SHASTA COUNTY.

(*From Our Special Correspondent.*)

Hall.—A good strike has been made in this mine across the ridge from the Midas Mine, at Knob.

Heintz Gold Extraction Company.—This company of Salt Lake City has secured ground along Clear Creek for gold-dredging.

TUOLUMNE COUNTY.

(*From Our Special Correspondent.*)

Crystalline.—A larger air compressor is to be set up on this mine, at Jamestown; C. E. Schafer, superintendent. The new gallows frame and hoist are completed.

Golden West.—This mine, near Sonora, G. Ghiglieri, of Stockton, general manager, will have its mill running very shortly. New boilers for the pumps have been put in and development is proceeding rapidly.

Hazel Dell.—At this mine, near Columbia, tests are being made as to best method of reducing the ore. There is a large body, but it is quite base.

Jawbone District.—The mines have now a post-office known as Lumsden. The claims in this district are showing up well, especially the Eclipse and Blue Eagle.

Lost Fox.—The shaft on this mine at Carters is down 200 ft. on an 8-ft. ledge of good rock.

Mapes.—On this mine at Yankee Hill miners are hydraulicking the surface preliminary to reaching the good ground 20 ft. below.

McAlpine.—This property, near Big Oak Flat, has been bonded by E. B. Burdick and others, of Washington.

Mustang.—At this mine, near Confidence, miners are drifting north on the vein in high grade ore. J. P. Oliver is superintendent.

Two Brothers.—Captain Ward, of San Francisco, is now sole owner of this mine, at Groveland and will shortly begin active work.

COLORADO.

BOULDER COUNTY.

(*From Our Special Correspondent.*)

Tambourine Gold Mining Company.—Favorable reports are received regarding the property of this company at Wall Street. The ore is said to be the typical sylvanite of the district. The shaft is down 350 ft. and the main work is being done on the 300-ft. level.

CHAFFEE COUNTY.

(*From Our Special Correspondent.*)

Buena Vista Smelter.—The reconstructed smelter at Buena Vista has blown in one of its new furnaces and work is being advanced on the other three.

Salida Smelter.—Work is progressing rapidly on the new smelter at Salida. Machinery and building material are on the ground and construction is under way.

GILPIN COUNTY.

(*From Our Special Correspondent.*)

Gilpin County Ore Shipments.—During February the shipments of smelting and crude ores, mill tailings and concentrates from the Black Hawk depot to the smelters and outside points of treatment, were 4,310 cars or 5,735 tons, showing a gain of 46 cars or 851 tons over January, 1901. This shows an increase of over 15 per cent, and augurs well for 1902.

Bertha Gold Mining Company.—The company is reported to have purchased the Carcassonne Mine, at the head of Elkhorn Gulch, and is going to install machinery and sink. M. W. Tanner, Idaho Springs, is manager.

Dictator.—A lease and bond in the sum of $10,000 for three years has been given to the Dictator Mines Company, in which local parties are interested with Ohio and Arkansas people. The property is situated in Eureka District, and the company intends to erect a new shaft-building and install machinery within 30 days. Robert H. Hastie, Nevadaville, will be in charge.

Fairfield Mining Company.—This company, capital stock of $500,000, has E. W. Williams, W. M. Nickerson and John McPherson as incorporators. Delaware and Maryland parties are interested, and will work the Fairfield Mine in Russell District.

Jones.—Denver and local parties are interested in this property, and in the 500-ft. level have opened up smelting ore-carrying values of $110 per ton. John Sparks, Nevadaville, is in charge.

Justice and Evelyn.—A deed has been placed on record from the New Haven & Denver Mines Company to Thomas A. Irvin, conveying these lodes in Lake and Russell districts. Operations are to start at an early date.

National Tunnel and Mining Company.—Chicago men are interested in a big group of claims near Black Hawk, and 2 shifts are running the Wabash tunnel now in 950 ft. The company intends driving the tunnels with electric drills, will sink a surface shaft to connect with the main tunnel, install machinery on the Caledonia Mine in Lake District and start up the Illinois Mine. C. W. Baldwin, Black Hawk, is manager.

Notaway Mining Company.—A good strike is reported in the West Notaway Mine in the 440-ft. level. It shows about 18 in. of the peacock ore, carrying values of between 6 and 12 oz. gold per ton. J. F. Perkins, Central City, is superintendent.

Pain Killer.—Nebraska parties have become interested, and are preparing to carry on heavier developments, including sinking. Some splendid silver ores have been taken out in former operations. G. D. Johnstone, Black Hawk, is manager.

Riverside.—Lintz & Co., of Central City, have taken a lease and bond on this property in Lake District, and are sinking with the shaft down 270 ft. The shaft shows a pay-streak of iron 8 in. wide, and the mine is credited with a fair production.

LAKE COUNTY—LEADVILLE.

(*From Our Special Correspondent.*)

Leadville Ore Production.—The tonnage for February compares favorably with that of January. Shipments are 1,960 tons daily of all grades of ore. If an arrangement could be made with the smelters for the treatment of low grade siliceous ores, changing the $9 per ton treatment charge, the daily output would be doubled.

A. Y. & Minnie.—As soon as the mill is completed special attention will be given to the separation of zinc ores.

Big Six.—The work of enlarging the shaft is completed and a cage installed which facilitates development.

Bohn.—A body of high-grade iron has been struck which runs from 26 to 30 oz. silver.

Caribou.—At present this mine is producing 125 tons daily of the richest ore in camp.

Catalpa-Crescent.—The output is 60 tons daily of good oxidized iron ore.

Diamond.—Exploration work is being carried on in this mine and a new pump has been installed at the 1,000-ft. level.

Dinero.—A large body of high-grade silver has been encountered on this property on Sugar Loaf Mountain and shipments from now on will be steady.

Evelyn.—Sinking from the 1,040-ft. level has started, the machinery installed being able to do the work satisfactorily.

Gold Basin.—Appearances point to this property in South Evans Gulch becoming a steady producer, as the vein has widened out to 2 ft. Thirty tons recently shipped netted $200 per ton.

Graham Gulch Mining Company.—The new shaft on the Star of the West group is down 300 ft. A further depth of 200 ft. will be necessary.

Greenback.—This mine continues to ship 200 tons per day of clean iron sulphide from the various drifts and cross-cuts. This mine has probably the largest ore body in the camp.

Helen Gould.—A good vein of copper ore has been encountered in a tunnel in this property, situated in East Tennessee Park. Samples are said to return 40 to 50 per cent copper.

Homer Placer.—The new shaft down 160 ft. is to continue the exploration work. It is the most important prospecting enterprise in the Leadville District.

La Belle Mining Company.—The company is working a portion of the Black Prince territory on the gold belt, a little below the 230 ft. level. In addition to an iron ore body it has a good siliceous ore.

Lillian Mining Company.—Different sets of lessees are working various blocks of this combination and making a fair profit in most cases. It is not likely that the mill recently destroyed by fire will be rebuilt.

Nisi Prius.—A very large pump, practically filling an 80-ft. station, has been installed at the 700-ft. level.

Penn.—Improvement is noted in the quality of ore being hoisted, assays showing an average of 1 oz. of gold.

Poverty Flats.—Considerable activity is noted in this section, particularly at the Grafton, Vulture and Fairview properties.

Rialto.—A diamond drill will work from the bottom of the shaft to determine the distance to the ore zone.

St. Louis.—This property in South Evans Gulch is worked by a tunnel, and ore above the average, running high in copper, is being taken out.

Valley Leasing Company.—A new plant of machinery is being installed at the property of this company and development will shortly start on the carbonate contact, traceable from Monarch territory.

OURAY COUNTY.

Camp Bird.—A snow-slide on February 28 killed a man and injured 3 others.

Governor.—At this mine in Sneffels District, a snow-slide on February 28 swept away a large tank and buried the dump, but fortunately did not reach the boarding house.

(*From Our Special Correspondent.*)

Mt. Sneffels District.—Repeated rumors are current of a consolidation of important mines in this district and the price now named is at least $10,000,000, though no direct information is given as to the properties included.

PITKIN CUNTY.

Argentum-Juniata Mining Company.—This company has recently published its report for the quarter ending December 31. The net profits for the quarter were $6,749, and the production amounted to 2,122 net tons of a gross value of $92,621. The average value was $32.85 per ton.

SAN MIGUEL COUNTY.

Liberty Bell Mining Company.—The most disastrous snow-slide ever known in the State occurred at this mine on February 28. Heavy storms had resulted in the accumulation of a great mass of snow on the slope of Smuggler Mountain above the mine buildings. These, however, were not thought to be in danger since they had been built behind a projecting ridge of rock which was expected to shield them from a slide. A first slide came without warning at 7:30 in the morning while the men in the day shift were preparing for work. About 200 men are employed in the mines and mill of the company and probably less than half of those were in the mine at the time. The others were in the boarding or bunk houses near by. The slide carried both these buildings down the mountain side and buried the debris in snow. Though the mine is but 2 miles from Telluride it was 10 o'clock before news of the disaster reached that place, when a number of men started for the scene. Meantime, a party of the surviving employees of the company had begun rescue work in the debris in the bottom of the canyon. Two other slides came down, burying many of the rescuing party, and a 4th slide came down in the afternoon about a mile below the mines carrying away 3 men who were returning to Telluride from the mine. So far as known 14 men were killed and as many injured, while the total deaths may reach 30. The dead include Harry A. Chase, assayer at the mine, and John R. Powell, surveyor. They were members of the rescuing party.

(*From Our Special Correspondent.*)

Gold Metals Mining and Milling Company.—This company has been incorporated at Telluride, under the laws of Colorado, for developing and operating mines in Prospect Creek Basin, 3 1-2 miles south of this city. It is stocked for 750,000 shares of $1 per share. The officers and principal stockholders are E. E. Peyson, Telluride, president; Charles Kilmer, Telluride, vice-president; Ed Deutsch, Telluride, treasurer; P. Murray Finnis, New York, secretary; W. H. Brohmer, Telluride, manager; F. M. Hill, Des Moines, Iowa, superintendent. The property consists of 11 claims lying between the Gold King and the Nellie and Ella. The Gold King has been a profitable producer for 15 years and the Nellie and Ella were substantial mines until litigation stopped work 3 years ago. A cross-cut tunnel is now in over 300 ft. and will cut the Gold Metal 300 ft. from surface. It will intersect this capital vein 1,500 ft. from surface. The veins range from 3 1-2 to 8 ft. wide. Samples show an average value of $25 per ton. It is the intention of the company to begin active work about April 1. A compressor will be installed and the work of driving the tunnel prosecuted by machine drills. A 20-stamp mill will be constructed which will be in operation by July 1.

Tomboy Gold Mines.—A very rich strike has been made at the Cincinnati Mine forming part of the Argentine group purchased by the Tomboy 2 years ago. It has the northern extension of the Argentine vein. The face of the drift, 8 ft. wide, is heavily mineralized, the gold is being freely mixed with galena, making specimens which are curiosities. The assays show averages of $2,600 to the ton. By careful work John Herron, manager, succeeded in paying for these mines out of the dividends realized from the first 3 months' work of his company.

SUMMIT COUNTY.

Bledsoe.—This group at Kokomo, is owned by a Denver investment company. A strike of good ore is reported in the cross-cut tunnel.

Braganza.—This mine, on Collier Mountain near Breckenridge, is worked by William Perrin and produces high grade bismuth ore.

Ohio.—The steam power plant is to be enlarged and an air compressor has been secured. The lower tunnel is in 100 ft. J. C. Simmons, of Breckenridge, is manager.

Ten Mile Company.—A strike of 7 ft. of good ore is reported from this company's property at Robinson. The company is composed chiefly of Leadville men.

TELLER COUNTY—CRIPPLE CREEK.

(*From Our Special Correspondent.*)

Mining Taxation.—A great deal of adverse comment has been created by the action of the State Legislature in regard to the taxation of mining property. Under the revenue law as passed one year ago such taxation has very greatly increased, both on the productive and unproductive property. In the case of the unproductive property, it will, in many cases amount almost to confiscation should the present law be carried out, as a number of the companies have no money in the treasury with which to pay the taxes. The present legislature is endeavoring to correct the present law, which has been found to be unconstitutional, and things are looking a little brighter for mine owners.

Assay Offices.—There is still considerable excitement over the blowing up of the 8 assay offices a week ago. No one has yet been arrested for the crime. Many theories have been advanced, one of which is, it was the instigation of the owners of some of the larger mines from which rich ore had been stolen in order to get rid of the offices. Another theory is, that it was done by the men who have sold stolen ore to these assayers and have not received fair treatment.

It is certain, however, that there was concerted action. Another thing certain is that these "high-grade" joints as they are called, are a menace to the district, as they enable men stealing ore to dispose of it.

Railroad Freights.—A number of conferences have been held by the officials of the Denver & South Western Railway, and of the Short Line, relative to some agreement by which the passenger and freight rate wars will end. For the past two or three months a rate war between these lines has been in progress. It is understood that some decision will soon be reached and the war ended.

Cripple Creek Mining Stock Exchange Association.—At a meeting of this association, the following directors were elected: H. L. Shepard, Edward Bell, Albert Wagner, C. N. Miller, J. S. Lawrence, E. H. Newland, J. F Vardaman, Curtis J. Smith and W. A. Delaney.

Acacia Gold Mining Company.—Good progress has been made in sinking the shaft on the McFarland & Ownbey lease on the north end of the Burns claim. On the main workings of this claim Dan Falve is taking out considerable ore. The Monarch Company also had a lease on the main part of the workings, but has stopped from financial reasons, and may not resume work.

Doctor-Jack Pot Consolidated. Company.—It is reported that the drift on the 700-ft. level, near where the rich ore shoot was found above, is looking very well, and it is thought that the ore will be as good as above. Water has made trouble, but is pretty well under control. This property is controlled by the Woods Investment Company.

Empire Gold Mining Company.—From all accounts this property is shipping pretty heavily. A new shaft has recently been sunk, and the equipment is in good condition. The company owns the property recently owned by the Orphan Gold Mining Company and the Arrow Gold Mining Company. The company is controlled by Nelson B. Williams and others, who, until recently, had control of the Isabella.

Findley Gold Mining Company.—The work of fitting the shaft, so as to use a cage, is in progress. New ore houses are also being built. It is understood that the company intends to sink to 900 ft. The property is on Bull Hill, near the famous Hull City Placer and northwest of that property. A large amount of ore has been extracted, mostly by lessees.

Gold King Mining Company.—The station at the 800-ft. level is being completed. It is reported that the property has an output of about 260 tons of 2 oz. ore per day. It is situated in Poverty Gulch, and is the oldest shipper in the district.

Rittenhouse Group.—The Cripple Creek-Colorado Company has begun sinking and it is understood that the 500-ft. shaft will go to 1,000 ft. before stopping. This property is situated on Gold Hill and formerly belonged to the Alamo Company.

GEORGIA.

BARSTOW COUNTY.

(*From Our Special Correspondent.*)

Georgia Iron and Coal Company.—This company has installed a 75-ton steam shovel at its brown iron ore mines, at Sugar Hill, with a capacity of 2,500 cu. yd. per day. The company has also purchased a number of Goodwin self-dumping cars, and has otherwise improved its plant.

FLOYD COUNTY.

(*From Our Special Correspondent.*)

Rome Petroleum and Iron Company.—This company, which consists largely of Chicago capitalists, has begun boring for oil in what is known as the Fat Woods district, about 4 miles northwest of Rome. It is the intention of the company to continue boring to 1,000 ft., unless oil is obtained before that depth.

IDAHO.

BLAINE COUNTY.

Little Florence.—E. L. Vancil has conveyed a 1-2 interest in this claim on the road from Hailey to Camas Prairie to the Intermountain Consolidated Mining, Milling and Smelting Company.

SHOSHONE COUNTY.

Gold Standard Mining Company.—This company is opening some deep placer ground on Pony Creek, between Wallace and Delta. It has secured additional claims recently near the mouth of the creek from F. C. Gordon. Daniel Love, of Murray, is in charge.

Leslie.—A tunnel has been started to reach the north ledge of this claim in which rich copper ore was found. The tunnel will be 700 ft. long. Wesley Everett, of Wallace, is manager.

Paragon Mining Company.—This company is reported to have struck a good body of clean galena in a ledge of concentrating ore on its property a few miles above Murray. The company's headquarters are in St. Paul, Minn. The company owns 5 claims on Upper Pritchard Creek. A. Steadman is manager.

St. Paul-Idaho Mining Company.—This company, which is working the Douglas group on Pine Creek, near Wallace, under bond, has drifted 475 ft. on the ledge, exposing considerable shipping ore. The company paid $15,000 of the purchase price, the remainder being due next November.

INDIANA.

Coal Miners' and Operators' Convention.—The joint convention of miners and operators at Terre Haute to determine the wage scale for the coming year resulted in a deadlock which is not yet broken. The miners wished a considerable advance in the price of mining, but the operators objected. The matter finally simmered down to a controversy over the allowance to be paid miners for removing top in thin veins, this being a matter of considerable importance in the northern field of the State.

BLACKFORD COUNTY.

(*From Our Special Correspondent.*)

Blackfield County oil fields operations for February show 27 wells completed and 24 drilling. The completed wells are average producers. In the whole Indiana oil field, including about 12 counties, 299 wells were completed in February and 189 started. The daily output of the wells amounts to 2,810 bbls. This is said to be a remarkable showing for February.

DELAWARE COUNTY.

(*From Our Special Correspondent.*)

Smith-Neely Oil and Mining Company.—This company has struck oil northeast of Muncie. The production is nearly 800 bbls. a day. The company will push the development of its leases. John Smith is president.

PARKE COUNTY.

(*From Our Special Correspondent.*)

An explosion of dust in Mine No. 1 at Lyford on the 23d ult., resulted in the injury of 7 men, 1 fatally.

Antioch Coal Mining Company.—This company, of Linton, has been incorporated with a capital of $100,000. The incorporators are Morton L. Gould, John A. Halbert and F. E. Nichols. The company will operate mines in this and Vermillion County, with head office at Linton.

MICHIGAN.

COPPER—HOUGHTON COUNTY.

Atlantic Mining Company.—At the annual meeting of the stockholders on March 11 the shareholders will vote to increase the capital stock from 40,000 shares of $25 par value, to 100,000 shares, each stockholder to receive certificates of the new stock in the ratio of 2½ shares, as of $9.80 per share paid in, in exchange for one share of the old stock, as of $24.50 paid in, thus increasing the capital from $1,000,000 to $2,500,000.

Wolverine.—The output for February was 245 tons of mineral, compared with 232½ tons in 1901.

COPPER—HOUGHTON COUNTY.

(*From Our Special Correspondent.*)

Osceola Mill Tailings.—M. R. Goldsworthy, of Hancock, Mich., has secured permission from the United States Government to remove tailings from the Osceola Mill outside of the harbor lines and forming an obstruction to navigation in lower Torch Lake. The tailings will be re-worked according to the most improved methods, and it is expected that considerable copper will be saved. The lake will be dredged to a depth of 24 ft., and the sand loaded on scows and removed to shore.

IRON—MARQUETTE RANGE.

Barasa.—This mine near Negaunee has closed down and the 262 ft. shaft has about filled with water. There is reported to be a large body of ore but to work it will require a large expenditure of money to cope with the water, the ore being overlaid by a thick mass of quicksand under a swamp. About 10,000 tons of ore are in stock at the mine. The company pays a minimum royalty of $30,000 a year.

Maas.—The new shaft at this mine near Negaunee has been sunk fast and is now down to the quicksand, where progress will be slow. About 65 ft. of quicksand must be pierced, while the total depth to the ledge is about 158 ft. The shaft is 4 compartment 15 ft. 10 in. by 11 ft. 10 in., inside the timbering. The timber used is Tennessee oak, Washington fir, and Michigan white pine. Two Prescott pumps, with a capacity of 4,000 gal. per minute, are mounted in the shaft and will sink with the timbering as the quicksand is removed. The bottom set of timber is shod with a sharp steel shoe weighing 6,400 lbs. The main timbers in the shaft are 14 by 14 in.

Volunteer.—At this mine on the Cascade Range near Palmer the Denora Company is about to begin mining. The water is about out of the shaft. From 100 to 150 men will be employed.

MINNESOTA.

IRON—MESABI RANGE.

(*From Our Special Correspondent.*)

Test pits are being sunk on the west side of the Mississippi River, south of Pokegama Lake, where there are some indications of ore. Assays are said to be good, but the existence of a large body of ore or even of a body in place, is undecided.

Crete Mining Company.—This company, capital $500,000, incorporators Gustav Vander Stein, G. W. Codrell and R. H. Crowell, of Ohio, has filed articles at Duluth. It will operate property on the Mesabi Range. The main office is in Cleveland, with branch office at Duluth.

Fayal Iron Company.—This mine will be stripped to the extent of 300,000 cu. yd. this year, and Drake, Stratton & Company, who will do the work, are getting shovels ready. They will employ from 250 to 300 men all the season. The mine is scheduled to ship this year about 1,500,000 tons, most of which will be from the open pit, though 3 shafts will be in operation, and already have large stockpiles. The mine will not reach its record of 1901, which was 1,660,000 tons.

Interstate Mining Company.—This company is now in ore with 2 shafts and will ship this year about 100,000 tons from the Lincoln at Virginia "A" shaft is down 110 ft. and is 40 ft. in the ore, considerable rooming has been done and the shaft is in shape for shipment. "B" shaft is down 40 ft. and is 10 ft. in ore. Large buildings have been erected and a boarding house. At the company's Grant Mine in section 20, E. 58, R. 19, a contract has been made to mine 50,000 tons of ore this year from the shaft sunk last season. A permanent shaft will be sunk here and the property opened on a large scale. This is a lease from the State of Minnesota; the Lincoln is a fee property.

Stevenson Mining Company.—This mine will start stripping soon. There will be 700,000 cu. yd. of material moved from the ore body during the year. It is said by James Corrigan, president of the Stevenson Mining Company, that the mine has sold 1,500,000 tons of ore for this year's delivery and that it will mine 1,800,000 tons in all. This is a large amount and there may be difficulty with the mine, or with the railroad in furnishing bars for the ore, or with both. The attempt will be watched with considerable interest by all men engaged in the movement of great tonnages. The handling of 700,000 yd. of surface and of 1,800,000 tons of ore, about 140,000 yd. more, all in less than 10 months, is quite an undertaking.

Williams Estate.—This estate, owner of a large acreage in T. 58, R. 16, is exploring some of its lands, under the direction of E. A. Sperry, late of Denver. So far, it is understood, nothing of value has been found.

MISSOURI.

JASPER COUNTY.

(*From Our Special Correspondent.*)

Joplin Ore Market.—The price of both lead and zinc ores remains practically unchanged throughout the district and the output is increasing. Much of the ore sold during the week remains in the bins from inability to get it loaded on the cars, owing to bad condition of the roads. Ore buyers paid more for lower grade ore than during the preceding week, but much of the high grade zinc ore was reduced 50c. per ton from the preceding week's prices.

The highest price paid for zinc ore during the week was $31.50 per ton, for the Hudson Mining Company's output near Carthage, Mo. The remainder of the top grade ore brought $31 per ton, or slightly less. Lead ore remained unchanged at $21.15 per 1,000 lbs., delivered.

During the corresponding week of last year the highest price paid for zinc ore was $27 per ton, and lead ore brought $23 per 1,000 lbs. During that the production of lead ore was about equal to last week's production, but the zinc ore production was over 600,000 lbs. less.

Following is the turn-in by camps of the Joplin District for the week ending February 1:

	Zinc lbs.	Lead lbs.	Value.
Joplin	3,088,550	473,040	$56,617
Carterville	1,949,410	291,320	31,678
Galena-Empire	1,096,300	199,050	17,485
Oronogo	754,730	44,910	11,860
Carthage	575,300	.....	8,872
Carl Junction	349,800	.....	5,072
Granby	307,000	76,000	4,290
Zincite	540,510	.....	8,226
Webb City	464,720	52,590	7,185
Aurora	418,210	2,900	5,498
Cave Springs	236,360	15,090	3,637
Duenweg	165,350	25,690	2,707
Spurgeon	91,110	86,330	2,971
Stotts City	136,750	.....	1,983
Roaring Springs	123,190	4,740	1,962
Badger	112,210	.....	1,571
Totals	10,439,240	1,295,330	$172,134
Total since January	90,301,260	10,417,000	$1,447,634
Zinc ore value for week	$143,984; lead ore value		$28,150
Zinc value since Jan. 1	$1,223,874; lead value		$223,760

MONTANA.

FERGUS COUNTY.

Spotted Horse.—This mine, at Maiden, has 2 shifts doing development on the 8th level, where about 100 ft. of drifting has been run, all of it showing ore.

FLATHEAD COUNTY.

(*From Our Special Correspondent.*)

American-Kootenai Mining Company.—The tramway connecting the mine with the 10-stamp mill has been carried away by a snowslide, destroying also about 300 ft. of flume from Mill Creek. The tramway was 2,200 ft. long and its destruction is a serious loss. The tramway and mill were completed last fall. This district, the principal town in which is Libby, has suffered severely by slides.

Blacktail Mining Company.—This property on Bramlet Creek in the West Fisher Mining District, had its new 10-stamp mill destroyed by a snow-slide. The mill cost $10,000, and had only made a trial run. Sanford & Grubb, of Kalispell, are the principal owners. What arrangements will be made for rebuilding the mill is not known. The destruction of this mill will be a serious blow to the West Fisher District.

Snowshoe.—A disastrous snow slide, the worst in the history of the gulch, occurred recently. Thousands of tons of snow, rock, earth and splintered timber came down the mountain side from the opposite side

of the gulch, completely filling it immediately opposite the concentrator, covering this building completely with the debris and blocking the mine openings. Several small buildings in the bottom of the gulch occupied by miners' families were destroyed, but fortunately no lives were lost. No estimate of the damage to mine and equipment can be made at the present. The concentrator was of 200 tons capacity. The property is owned by an English company but is under a lease to local parties. It is thought that fully 60 days' time will be necessary to repair the damage.

MADISON COUNTY.

Butte & Potosi Mining Company.—This company has had 8 men at work on its group of 4 claims 11 miles south of Pony for some time, and has driven a cross-cut tunnel 115 ft., opening a body of galena 9 ft. wide said to assay 60 per cent lead, 12 oz. silver and $48 in gold. The company talks of erecting a 100-ton concentrator in the spring.

Lester.—This group of claims in Hulbert Canyon, owned by J. Armors and R. Jeffries, is opened by a tunnel 570 ft. long showing a lead 26 ft. wide. The ore is said to average $8 per ton.

Mountain Meadow.—This property at Pony is developed by a 50-ft. shaft. In a drift from this 3 ft. of shipping ore have been struck. The mine was recently bonded to Butte men for $30,000. They failed to take up the bond and the property reverted to the owners, C. McKettrick and E. S. Adkins.

(*From Our Special Correspondent.*)

Red Bluff Gold Mining Company, Limited.—This company with home offices at St. Hyacinthe, Quebec, Canada, has been preparing to resume work this month on an extensive scale. Specifications have been accepted from the Mine and Smelter Supply Company, of Denver, Colo., for a 100-ton concentrating plant. The plant is to be delivered in full in 90 days. It consists of a Blake crusher, Cornish rolls, stamps and Wilfley tables, with a Corliss engine. Excavating and building will commence immediately the plans arrive. Many alterations have been made in the old plant which, it is expected, will reduce the expense of running considerably. The boile plant is of 240 h. p., and has been overhauled and renovated. The boilers have been reset and the steam line taken up, the condensation in the old line proving to be very expensive. The new line runs on a trestle direct from the boiler house to the shaft and is properly protected. Pumping operations will not start until the mill has been very nearly completed. With the exception of one sinker the whole of the outfit in the mine was drowned, both the sinking and the station pump. The drainage tunnel has been considerably enlarged. A new coal bin at the boiler house has been built, capable of holding 100 tons.

SILVER BOW COUNTY.

(*From Our Special Correspondent.*)

Anaconda Company.—This company is installing at the Neversweat a 500-h. p. electric motor, power to operate which will be furnished from the Missouri River transmission line. The motor will be used to run the air compressing plant and blowers. On the 2,200-ft. level of the High Ore Mine there will be placed a pumping plant capable of handling all the water of the mines on the hill. The combined capacity of the several pumps will be 4,000 gals. per minute; the lift will be broken by a system of three or more relays. The pumps are being furnished by the Dixon shops of the Allis-Chalmers Company, of Scranton, Pa. A new machine shop has been built at the Anaconda of brick and iron, which will take care of the work for the hill mines, instead of sending the work to the shops in the town of Anaconda.

Moose.—Malcolm Gillis & Co., who are operating this property belonging to the Boston & Montana Company, under a lease, have encountered a good showing of copper ore on the 400-ft. level. The mine is north of what is considered the copper belt and has always been considered a silver proposition.

Sinbad.—The shaft is down 700 ft. and the ledge will be prospected. The result will probably determine whether additional sinking shall be done or not. This shaft is located on the flat east of Meaderville.

Spectator.—At this mine, belonging to the Largey Estate, and J. A. Creighton, of Omaha, sinking the main shaft to the 1,600-ft. level is going on. This mine is situated north of the Syndicate Group, and has recently settled a long standing lawsuit between it and the Bell Mine belonging to the Anaconda Company. In the settlement the ore body in dispute is divided proportionately between the two, giving each mine the opportunity to mine its portion. The matter had been in the courts for 10 years, and was the first of the sensational apex suits to be tried in the camp.

OHIO.

ATHENS COUNTY.

Pittsburg Coal Company.—This company has purchased from the Ewing Coal and Salt Company, 1,123 acres of coal land on the Hocking Valley Railroad, at a reported price of $112,000. The property is undeveloped but is reported to carry a good seam of coal. It will not be developed at present.

OREGON.

GRANT COUNTY.

Red Boy Consolidated Gold Mines Company.—This company has just been formed under the laws of West Virginia, by E. J. Godfrey, of Portland, Clark Tabor, of Granite; J. H. Robbins, of Sumpter; Jas. A. Howard, of Pendleton; C. A. Johns, of Baker City, and N. C. Richardt, of Sumpter. It is capitalized at $3,000,000 in $1 shares, and is formed to consolidate the Red Boy and the Concord mines. The stock is divided into common and preferred, the preferred carrying a guaranteed dividend of 3 per cent annually, after paying which the common stock shall also receive a 3 per cent dividend. Any surplus remaining will be used for paying dividends on both classes of stock.

PENNSYLVANIA.

ANTHRACITE COAL.

Jersey.—This mine of the Delaware, Lackawanna & Western Railroad, at Wilkes-Barre, has been on fire since May and the fire is still spreading.

Lehigh Valley Coal Company.—This company makes the following statement for January and the two months of its fiscal year from December 1 to January 31:

	January.	Two months.
Earnings	$2,000,031	$4,041,692
Expenses	1,990,254	4,043,153
Net or deficit	N. $9,777	D. $1,461

For the two months there was an increase of $101,048 in earnings; an increase of $52,048 in expenses, and a resulting decrease of $49,000 in the deficit.

Philadelphia & Reading Coal and Iron Company—This company makes the following statement for January and the seven months of the fiscal year from July 1 to January 31:

	January.	Seven months.
Earnings	$2,658,060	$17,963,299
Expenses	2,449,385	16,318,285
Net	$208,675	$1,645,014

For the seven months there was an increase of $1,214,548 in earnings; an increase of $900,933 in expenses, and an increase of $313,615 in the net result.

BITUMINOUS COAL.

Apollo Coal Company.—This company consisting of H. C. Burkett, J. R. Risoman, J. M. Gallagher, of Greensburg, has been incorporated. The company has bought the fee of 160 acres along Kiskiminetas River, between Salina and Roaring Run.

Harris Coal and Coke Company.—This company in Indiana County, near New Florence, recently closed a deal involving $24,000 for coal lands in West Wheatfield Township. The company is shipping 125 tons of coal daily.

Pennsylvania & Northwestern Railroad Company.—The company recently elected these directors: Samuel Rea, president; N. P. Shortridge, W. A. Patton, E. B. Morris and Thomas DeWitt Cuyler. The Pennsylvania Railroad Company has secured over two-thirds of the capital stock of the Pennsylvania & Northwestern, and under Mr. Rea will carry out the plan of consolidation and merger of that road with other coal roads in the region. It is stated that these roads include the Cambria and Clearfield Railroad Company, Cresson & Irvona Railroad Company, Ebensburg & Black Lick Railroad Company, and the Tyrone & Clearfield Railroad Company.

Somerset Smokeless Coal and Coke Company.—This company with a nominal capital of $25,000 is about to be incorporated by Edward F. Fisher, Wm. E. Nusser and Wm. H. Roberts, of Pittsburg. The company will have 125 acres of coal land near Berlin, which is producing now about 300 tons of coal daily.

SOUTH DAKOTA.

LAWRENCE COUNTY.

(*From Our Special Correspondent.*)

Galena Mining and Smelting Company.—A number of the company's claims in Bear Butte District are worked under lease. C. B. Harris is shipping silver-lead ore from the Richmond, and James Secoy is taking out similar ore on another claim. George L. Griggs has the privilege of cutting timber on the company's ground, and is selling it to the Homestake Mining Company, the Clover Leaf Mining Company and the Burlington Railroad.

Globe Mining Company.—Martin Johansen has received $9,000 from the company during the last 2 weeks for property purchased of him. The company has a bond on other property for which it is to pay $10,000 during March. All the ground lies just west of Lead.

Glover Gold Mining Company.—The shaft is 357 ft. deep and drifting has begun from the bottom westward. Nearly all the work has been done in a porphyry capping, the material assaying from $1 to $15 a ton.

Golden Reward.—The company has made an upraise from the lower workings of the Union shaft and connected with the Mikado shaft, sunk several years ago. The connection was made for ventilation.

Hidden Fortune Mining Company.—J. J. Schlawig, of Sioux City, has received the final payment on ground sold the company. The annual meeting is to be held in Denver in March. It is expected that the stockholders will then decide upon a site for the proposed stamp mill and cyanide annex.

Pennsylvania Mining Company.—Good ore has lately been encountered on this property 1½ miles west of Lead. Development has been under way over a year.

Shawmut Mining Company.—A reorganization is being effected and the company proposes to enlarge the cyanide plant in Blacktail Gulch. The ore is a low grade conglomerate and will not pay to treat unless it can be handled on a large scale.

PENNINGTON COUNTY.

(*From Our Special Correspondent.*)

Gertie Tin Mining Company.—Machinery has been secured for unwatering the shaft at Hill City. The shaft house and plant were burnt several years ago, and the 420-ft. shaft is full of water.

J. R. Mining Company.—Work is to be started in March on the property after several years' idleness. The mine was a rich producer several years, until a barren zone was reached in the ledge. The J. R. Company expects to find the values again by sinking. The ledge is 40 ft. wide, and above 100 ft. was quite rich.

Tycoon Mining Company.—Part of the machinery has arrived for the stamp mill. The company has purchased Wilfley tables, and new stamps and mortars. An air compressor has been ordered for the mine and a new pump will be put in the creek to furnish water for the mill. The ore will be conveyed to the mill by a tunnel from the 200-ft. level of the main shaft.

UTAH.

(*From Our Special Correspondent.*)

Salt Lake Bullion Settlements.—During the week ending March 1 the banks made settlement on ore, $195,400; gold bars, $81,600; copper bullion, $1,800; auro-cyanides, $1,900; making a total of $280,700.

BEAVER COUNTY.

(*From Our Special Correspondent.*)

Cactus.—Sinking of the 3-compartment shaft goes on and some very satisfactory ore is being blocked out. Samuel Newhouse and associates are arranging for the erection of a testing mill, complete in all details, to serve as a guide for the large plant that Mr. Newhouse will erect.

Horn Silver.—The difficulties with the smelter have been very much magnified in the various rumors in circulation. The company is shipping moderately and is blocking out ore. Great quantities of this are in the stopes waiting the settlement of prices. It is stated by the management that there is strong probability of the company erecting its own smelter.

IRON COUNTY.

(*From Our Special Correspondent.*)

Margaret.—The latest developments disclose in the 150-ft. level a body of ore said to average $17 in gold per ton. This same shoot extends to the surface.

JUAB COUNTY.

(*From Our Special Correspondent.*)

Tintic Shipments.—Shipments for the week of March 1: May Day, 8 cars; Uncle Sam, 5; Carissa, 11; Grand Central, 9; Yankee Consolidated, 15; Lower Mammoth, 3; Mammoth, 6; Bullion-Beck, 3; Star Consolidated 2. Shipments from this camp for February are given as 241 cars of ore, and 27 cars of concentrates. The Mammoth Mill shipped 3 bars of bullion.

Fish Springs Shipments.—The shipments for the week ending March 1 were: Utah, 1 car of ore.

Apex Mining Company.—The management has decided to open the ground nearest the Humbug and Richmond-Anaconda ore bodies. A tunnel has been started to tap a showing of copper and iron.

Boss Tweed-Victor.—The miners ran into the workings of the Victor lately, making a surprise for both managements. The companies have met the situation in a friendly manner and are proceeding to straighten it out. An underground survey has started and the management of both companies say they will abide by the decision of the surveying corps. Long litigation will thus be avoided.

Helen Mining Company.—The directors have levied an assessment of 1c. per share, which becomes delinquent on March 22. C. F. Spillman, of Eureka, is secretary.

May Day.—A strike in one of the drifts below the 100-ft. level is said to show an average value of 80 oz.

silver per ton. The dry concentration mill has sent its fourth shipment to the sampling works in Salt Lake City. F. Flindt went with the shipments to attend the sampling.

Tesora.—J. B. Fleming has put the concentrator in shape and it is now running satisfactorily. About 75 tons of ore goes through the mill every 24 hours, making 25 tons of concentrates. Stoping is going on from the 325-ft. level up and some good shipping ore is finding its way to the market.

SALT LAKE COUNTY.

Boston Consolidated.—A strike of copper ore is reported in the lower tunnel. The exact value of the strike seems to be undetermined as yet.

(*From Our Special Correspondent.*)

Bingham Shipments.—Shipments for the week ending March 1 are: Red Wing, 2 cars; Bingham matte, 4; Queen Mill (Butterfield Mine) 3; Tiewaukee, 5; Phœnix, 1; Columbia, 1.

Bingham Copper and Gold Company.—The management is storing matte. The converter plant will be ready about May 1.

Ben Butler.—An assessment of 1c. a share becomes delinquent March 31. The assessment is for liquidating an obligation incurred some months ago in acquiring some valuable ground near the original holdings.

Utah Consolidated.—The shipments for the week ending March 1 to the refineries were 3 cars of bullion weighing 185,000 lbs.

SUMMIT COUNTY.

California.—This company's mine at Park City has closed and the miners have been paid off. Development work, it is said, has failed to show up enough pay ore to keep the mill busy. The company is reported in debt $45,000. The stock is non-assessable and the treasury stock is all sold.

(*From Our Special Correspondent.*)

Park City Shipments.—Shipments for the week ending February 1 are: Ontario, 1,111,000 lbs.; Quincy, 1,250,150 lbs.; Daly West, 751,625 lbs.; Anchor, 214,070 lbs.; Silver King, 1,520,000 lbs.; total, 4,840,845 lbs.

Daly West vs. Quincy.—Through the firm of Dickson, Ellis & Ellis, the Daly West has filed a bill in equity which alleges practically the plaintiff's ownership of the property now worked by the Quincy, through an apex right. Although the company has said it would not enter court and that the differences would be settled outside, the suit appears to resemble the famous Grand Central-Mammoth case. The Daly West accuses the Quincy of taking out ore and alleges that the value of the claims being worked by the defendant which are involved in the suit is over $1,000,000. An injunction is asked to enjoin the Quincy from taking out ore until the matter is adjusted. It is still asserted that the differences will be settled amicably.

TOOELE COUNTY.

Midas.—F. Dern and J. W. Candler recently brought into Salt Lake a consignment of cyanides said to be worth $4,000 representing a 12 days' run on 230 tons of ore. The will has shut down temporarily on account of a scarcity of water. It is thought that a 5-mile pipe line will be built to provide water at all seasons.

(*From Our Special Correspondent.*)

Stockton Shipments.—Shipments for the week ending March 1 are: Ophir Hill, 26 cars; East Honerine, 1; Galena King, 1.

Clark Electric Power Company.—An enterprise headed by E. W. Clark, of the Ophir Hill Mining Company, with F. Pierce, E. B. Critchlow and W. J. Barrett, of Salt Lake City, intends to establish an electric power and lighting station at the mouth of Settlement Canyon to supply the city of Tooele with light and the camp of Stockton with light and power. The plant will be about 8 miles from Stockton and 2 miles from Tooele. Bids will be asked in a few weeks and the construction will begin in the spring. R. J. Decker is consulting engineer.

WASHINGTON COUNTY.

Barbee & Walker.—This old mill at Silver Reef will be enlarged and remodeled, the intention of the company being to put in new pans and settlers in addition to which an electric power plant will be installed. Before the close of the year the Brundage Mining and Development Company, of Cleveland, O., owner, may put in a new mill of from 50 to 100 tons daily capacity during the year. T. L. Brundage, president of the company, has been at Leeds directing operations in remodeling the plant.

WASHINGTON.

Coal Production.—The annual report of State Coal Mine Inspector, C. F. Owen, shows that the total amount of coal mined during 1901 was 2,504,190 short tons, an increase of 86,156 tons over 1900. The amount of coke produced was 49,197 tons, an increase of 13,275 tons over 1900.

The use of oil as fuel, the report says, has displaced coal in the California market to a considerable extent in the past year. But for this the increase of output over 1900 would undoubtedly have been greater. The local demand for coke and coal is very rapidly increasing, however. The coal mines in the State are located in the following counties: King, 11; Pierce, 4; Kittitas, 1; Skagit, 1. The mines employ 4,826 men. The largest producer was the Northwest Improvement Company, of Roslyn, Kittitas County, 1,005,027 tons. The Carbon Hill Company, of Carbonado, Pierce County, produced 323,395 tons, and the Black Diamond Coal Mining Company, of Black Diamond, King County, 227,000 tons.

FERRY COUNTY.

(*From Our Special Correspondent.*)

Golden Lion-Little Four.—The Golden Lion Tunnel, at Republic, is in 550 ft., a gain of 90 ft. since resuming work. The country rock at the breast is solid porphyrite.

Gold Ledge.—A report that the vein was encountered is untrue. The tunnel is in 867 ft.

Maloney-Blue Lead Copper Company.—The drift on the ledge is 120 ft. long, and the ore is improving in grade. This drift leaves the main tunnel 1,630 ft. from the entrance.

WYOMING.

CARBON COUNTY.

Ferris-Haggarty.—Work on the 15½ mile tramway to connect this mine at Battle Lake with the Boston-Wyoming Smelter at Grand Encampment is to start soon under the management of B. C. Riblet. The tramway, owing to its length and the nature of the country, will be built and operated in 5 sections. The speed will be about 250 ft. per minute and the buckets will hold 700 lbs. of ore. It is thought that the tram will be completed by September 1.

FREMONT COUNTY.

Tabor-Grand Mines.—This property adjoins the Carissa Mine at South Pass, and has been in operation several months. Leyner drills and air compressor are in use; a Huntington mill installed has a capacity of 285 tons per day; about $30,000 has been spent upon the property in improvements in the past year. There are said to be some 10,000 tons of gold ore blocked out and about 125 tons in the bins in the mill. The property is owned by N. A. Baker, of Denver, Colo.

FOREIGN MINING NEWS.

CANADA.

BRITISH COLUMBIA—ROSSLAND DISTRICT.

Rossland Ore Output.—The output for the 6 days ending February 21 and for the year to date according to the Rossland *Miner*, is as follows:

Mine.	Week.	Year.
Le Roi	4,165	32,930
Le Roi No. 2	1,250	7,900
Cascade	....	150
Bonanza	....	60
Velvet	40	80
Total	5,455	41,120

Centre Star.—Work is confined almost exclusively to development. Steady progress has been made with the work in the main shafts and on the drifts at the 600 and 700-ft levels.

Green Mountain.—Sinking on the 2-compartment shaft below the 200-ft. level is under way. Rapid progress is being made.

Le Roi.—Stoping and development work are progressing steadily. The contract work in the lower levels of the mine is to be started immediately.

Le Roi No. 2.—In the Josie and No. 1 mines mining goes ahead steadily, as also in the Nickel Plate.

Velvet.—Ore is being broken down for shipment to Nelson and is being taken over the wagon road as rapidly as possible. Four cars have already been sent to the smelter and 2 cars are now being loaded at Velvet Siding.

YUKON TERRITORY.

Joseph Ladue Mining Company.—There was some excitement at a recent meeting of stockholders in this company at Jersey City, N. J. The company controls property near Dawson City. Some of the stockholders recently complained because the company had not been paying dividends for some time, and expert accountants were employed to go over the books. At a recent meeting in New York City the board of directors read a report from the experts showing a shrinkage in the assets. The directors thereupon appointed a committee consisting of Walter A. Phelan, Almond J. Pierce, Williard Brown and John A. Sleicher to investigate further. The stockholders have authorized the appointment of a committee composed of G. J. Howell, G. H. Lewis and John Meyers, all of New York City, to act in conjunction with the directors' committee. Secretary and Treasurer Elmer F. Botsford announced after the meeting that the reported apparent shrinkage was due to differences in bookkeeping methods. The meeting adjourned to May 6, when the joint committee was to report.

MEXICO.

CHIHUAHUA.

(*From Our Special Correspondent.*)

The new steel company of Monterey, is opening some manganese properties in the Alliacle mining district, this state.

Granadenas.—This mine, owned by Victor Penrose, in the Santiago District, near Parral, is reported sold to Dr. Dillon Brown, of New York City. The ore carries gold, silver and lead.

La Reyna.—This property of Arthur Longega, in the Santa Barbara District, has gone into bonanza, the main vein encountered showing a large body of rich silver ore running from ½ to 1 oz. in gold.

Montezuma Lead Company.—This company is running its 400-ton mill at Parral full capacity, and will put in 6 more Wilfley tables to increase the output. The same company has completed a spur to the Novidad Mine from the main line of the Mexican Central.

Parral Mines, Limited.—This English company is completing, and will have in operation at its La Union Mine near Parral early in March, a 100-ton concentrating and amalgamation plant. S. Cragoe is manager.

San Vicente Capusalla.—The Sierra Madre Exploration Company, through Mr. Evans, the president, has sold for $50,000, gold, this group at Parral to Cripple Creek, Colo., men. Extensive preparations are already under way for development of the properties.

Sierra Madre Exploration Company.—This company is composed of Parral and Cripple Creek, Colo., men, with D. M. Evans, president; A. A. Evans, vice-president, and James L. Lindsay, secretary and treasurer.

Terrenatis.—A large body of 120 oz. ore is reported uncovered in this mine at Parral.

NEW CALEDONIA.

Exports of ores in December included 5,550 metric tons nickel ore to France; 4,070 tons chrome ore, of which 939 tons went to Sydney, N. S. W., and 3,131 tons to New York; 39 tons of cobalt ore; and 32 tons of copper ore. The total exports from New Caledonia for the year ending with December are reported as follows by the *Bulletin du Commerce*, of Noumea, in metric tons:

	1900.	1901.	Changes.
Nickel ore	100,319	133,098	I. 32,779
Chrome ore	10,474	16,587	I. 6,113
Cobalt ore	2,438	2,873	I. 435

The increase of nearly 33 per cent in nickel ore is an excellent showing for the colony.

NEW ZEALAND.

(*From Our Special Correspondent.*)

Gold Dredging.—During the past few weeks the returns from the Otago dredges have been satisfactory, considering that the Molyneux River is at its highest level. During 1901 the published returns of the Otago dredges amounted to 65,531 ozs., of a value of about £250,000 ($1,250,000). This means a weekly average of 27 ozs. per dredge, but allowing for time lost during repairs, floods, etc., the average weekly return was about 20 ozs., or say £75 ($375) per dredge, the average working expenses being £40 to £50 per week; this leaves a good margin of profit. Considering that during the past year the Molyneux, our principal dredging river, was often in flood, and usually far above its normal level, the current year will probably be much better for the industry. The West Coast dredges still continue to obtain good returns, and are probably equal to the average Otago dredges as regards profits. During 1901 the dredges on this field obtained 12,305 ozs., valued at about £47,000 ($235,000). This gives a weekly average per dredge of 23 ozs., or, allowing for lost time, of about 18 ozs.

Hauraki Gold-fields.—During 1901 the quartz mines yielded bullion to a value of £740,356 ($3,701,780), an increase of £105,322 over 1900. Towards this amount the Waihi Mine contributed £454,386 ($2,271,930), or over 3-5 of the total. The total production of this mine to date is £1,974,512 ($9,872,560). The Crown Mine holds second place, far behind the Waihi, with a yield of £68,073 ($340,365) for the year. The other principal bullion producers are the Waitekauri, Union-Waihi, Barrier Reefs, Kauri Freeholds, Royal Oak, Kuranui-Caledonian, May Queen and Talisman mines. During the current year the probability is that this gold-field will about maintain last year's production. A decrease is not likely, but no large increase is to be looked for.

MINING STOCKS.

(Complete quotations will be found on pages 370 and 371.)

New York.	Mexico.	San Francisco.
Boston.	London.	Salt Lake City.
Philadelphia.	Paris.	Spokane.
Colo. Springs.	Toronto.	St. Louis.

New York. March 6.

Copper stocks are weaker, and it is believed will continue to fluctuate on their present basis so long as insiders manipulate the market.

The discussion as to the April quarterly dividend of Amalgamated is still on. In some quarters it is thought the regular 1 per cent will be declared. In April, 1901, when the capital stock was $75,000,000, the quarterly dividend was 2 per cent. Now that the capital is $155,000,000, the dividend has been cut in half on the 1,538,879 shares issued, showing a total distribution of little more than was made when the capital was $80,000,000 less. Another unfavorable feature is the reduction in the market value of the shares. A year ago the original 8 per cent stock sold around $93, while to-day the 4 per cent shares have receded to $67 3-4; showing a drop of over 25 points. Anaconda, which is controlled by the same interests that dominate Amalgamated, has weakened sympathetically. Anaconda's semi-annual dividend is also due in April, but what it will be is not known publicly, although some expect the October rate of $1.25 per share. This, it will be remembered, is 25c. less than was paid in April, 1901, when the stock was on a 16 per cent annual dividend basis. In a year's time the price of the shares has fallen from $45 to $32, or 13 points, reducing the market value of the property $15,600,000. The curb coppers have been speculatively active, especially Greene Consolidated, of Mexico, which sold at $20 1-4@$26, closing around $24. Tennessee shares reappeared on sales at $13 3-4@$14. British Columbia fluctuated between $10 1-4@$9 3-4; Montreal & Boston, of British Columbia, at $4 5-8@$3 3-8, and Union, of North Carolina, at $4@$3 5-8. Some business was done in White Knob, of Idaho, at $22 1-2@$23 1-4.

Ontario Silver, of Utah, made a sale at $8 1-2.

Alice, of Montana, has been heard from for the first time in quite a while. The price, however, has not advanced from 48c.

In the Colorado section interest is still centered in the Cripple Creek group, but prices show little change. Portland went forward at $2.65, and Elkton at $1.25.

The Comstock stocks are uncertain, one day rising in price on San Francisco advices, and the next receding on room trading. Consolidated California & Virginia weakened from $1.40 to $1.35, and Ophir from $1.05 to 95c.

At the close the local mining market is weak, but there are indications of an early rally in the favorite copper and gold stocks.

Boston. March 5.

(From Our Special Correspondent.)

The copper share market has been undergoing a reaction, but seems now to have steadied. All told, Boston has had a good market, and it almost seemed like old times. There has been quite a fair attendance in brokers' offices, and, although the market has been largely professional, better prices are expected. Dominion Coal has been by all odds the feature, having advanced $19.75 in the week to $104.75, with reaction to $99.50, and to-night's close $101.75. This stock started at $52.50 January 1, and has risen almost 100 per cent since. Control of the property has gone to Canadian interests, and late buyers have been shipping it in blocks across the line. A large contract has been made with the Canadian Pacific Railway for coal. Dominion Iron & Steel was affected unfavorably by the announcement that the capital would be increased $10,000,000, which means the capitalization of floating debt. This issue is said to have been underwritten at 30 by Canadian banks. The stock fell $4 to $30.50, but recovered to $35 to-day.

A splurge was made in Arcadian mining, and the price was pushed up $4 to $9, with subsequent reaction to $6.75. A report was current that a new find had been made east of the Arcadian lode, at a depth of 300 feet. It is said to be 6 feet wide, and well mineralized. Elm River rose $2.75 to $5.25 in sympathy, reacting to $3.50. There is a bond of sympathy between these two properties, as nothing of value has ever been found at either. Osceola and Tamarack have both been under continued pressure again this week. The former has fallen $6 to $71, and the latter $28 to $207, both recovering slightly. The late Leonard Lewisohn was a director of both these companies, as well as vice-president and director of the Tennessee Copper Company. Mr. Lewisohn was reported to be the owner of 50,000 shares of Utah Consolidated mining stock, and his visit to London, in part, was to secure the London proxies for use at the annual meeting against the present management, which is a Standard Oil one. The ownership of the latter is said to be small and against stockholders' interests.

Copper Range Consolidated has slid off $2.25 per share to $45.75. The talent is ready to take hold of this specialty at the proper time, and fireworks are promised. Considerable underwriter's stock is thought to have been marketed this week, as there is a profit at anything above $40. Trinity, which is a Lawson birth, gave a good exhibition, rising $6.50 to $18.50, with reaction to $14.50. Reports are current of consolidation with an adjoining property. Montreal & Boston has been particularly active, rising to $4 to-night. The smelter is expected to be blown in this month. Mass mining spurted $2.25 to $20.50, but reacted to $18, and Mohawk has fallen $3 to $35. Centennial has also been active, varying from $18.25 to $15.75, and closing at $17. All the cheap class of stocks have shown more animation than for some time.

San Francisco. Feb. 28.

(From Our Special Correspondent.)

More activity characterized the mining section, and prices ruled steady. Yesterday sales of Consolidated California and Virginia were made at $1.30@$1.32½; Ophir at $1.15; Silver Hill at 59@60c.; Mexican, 33@34c.; Union at 23@24c., and of Hale & Norcross at 30c.

Business on the Producers' Oil Exchange continues fair. Sales noted include: Thirty-three at $7.50; Peerless, $6.50, and Monte Cristo, $1.35.

The Reed Oil Company has called a meeting of stockholders for April 6 to vote on a reduction in the share-capital from $2,000,000 to $150,000. This action has been made necessary by the sale of a large part of the company's property to the Associated Oil Company, of Kern County, Cal. The Reed stockholders secure 1½ shares of Associated Oil stock for every share surrendered, and in addition $121,000 in 5 per cent gold bonds. Proceeds from the sale of these bonds will be distributed in the form of a dividend to the Reed stockholders. The Reed Company also gets all in excess of 22½c. per bbl. that the Associated Company receives on the sale of contracts turned over to it by the Reed. These contracts call for the delivery of 35,000 bbls. per month, and run from 3 to 5 years. The Reed Crude Oil Company still has 280 acres of land in the Kern River field. The company paid a second dividend of 2½c. per share, or $50,000, a few days ago, making $100,000 distributed to date.

London. Feb. 22.

(From Our Special Correspondent.)

The South African market has been quiet again this week, owing to speculators realizing their profits. Rather more than two years ago, just when the war broke out, everybody was buying for an almost immediate rise, thinking hostilities would be over in a few months and British government established with practically no break in the gold production. These people are now selling out, as the profit obtained is very substantial. There are also other people of course who are buying for a further rise, but as the sellers predominate the quotations are far from strong, and in the case of the more speculative shares there has been some relapse. The general impression is that the shakiness is only temporary and that advances will take place again soon. A considerable number of companies are now making new issues of shares to provide capital for reopening mines and plant and extending operations. The absorption of these shares is not rapid, as they are being issued at almost the market rates and consequently there is not much inducement to the speculator.

A new issue in the African market that promises to become an important speculative feature is the Consolidated African Copper Trust, Limited, which has been formed with a capital of £600,000 by the Consolidated Gold-fields of South Africa and the De Beers Company to acquire a number of copper properties in Rhodesia, mostly in the Lomagunda District. A good deal has been heard of discoveries of copper in Rhodesia during the last three years, but technical details have never been published. The present company has not issued a prospectus, so the public has no information to go on. This old method of introducing the shares we had thought had been abandoned by eminent issuing houses. Of the capital £372,000 is taken in shares as purchase price, while 100,000 shares of £1 each have been acquired by a syndicate and the remainder held in reserve. The syndicate are now offering the shares for sale at £4 each, a very stiff premium under the circumstances. There is no likelihood of the shares rising in value while the syndicate have any left to sell, and after that the probability of a rise is not great, though the sellers are trying to talk them up to all sorts of impossible figures. The issue is not popular at present, but when the sale of the shares is on a proper basis, and the details of the properties are given there should be a good speculative market for the shares. Though information about the properties is kept back, there can be hardly any doubt that they are of considerable prospective value. I believe, however, that comparatively little work has been done on any of them and that none of them can be classed as proved properties.

The report of the Le Roi Mining Company for the period from its formation up to June 30, 1901, has just been issued and the facts and figures relating to the company have thus for the first time been made public. As you will be publishing this report elsewhere in your columns it is not necessary to go into details here. The report has had a depressing effect on the market, for it shows that there is a large debt to be paid off to the Bank of Montreal before any dividends can be paid, while the margin of profit for the future will be so small that the shares will be of little speculative value. The market has also been treated to a reply by Mr. Bernard Macdonald to Mr. Frecheville's statements in his report on past management. No great interest is taken in this reply, as it is known that it is quite impossible to judge of the matters in dispute. The question is not so much one of the ability of the mine manager as of the management of the company from London and the average man is not inclined to blame Mr. Macdonald for the muddle. The reports of the Rossland Great Western and the Kootenay mining companies, belonging to the same group for the period from their formation to September, 1901, have also been issued. Though neither shows any profit made, their positions are really much more favorable than might be expected. These companies are still under the direction of the Whitaker Wright group and efforts are to be made at the coming meeting of shareholders to remove the board and introduce new control. The people who are taking these steps are James Flower & Co., a stock exchange firm which was badly hit by the failure of the London & Globe. I have not heard yet what proposition the firm will make nor what amount of support they may expect. If they are at all energetic, however, they should have no difficulty in carrying shareholders with them.

The publication of reports by the Dolcoath Mine, Limited, and the Carn Brea and Tincroft Mines, Limited, has attracted attention once more to mining schemes in Cornwall. The latter company has not been successful during the half year ended December 31, and has made a loss owing to the drop in the price of tin. No discovery of mineral of any importance has been made. The amount of ore crushed was 25,886 tons producing 325 tons of black tin which sold for £20,261. The expenses were, however, £4,000 greater than this. The Dolcoath Mine, on the other hand, during the same period made a profit of £16,000. Owing to the energetic development of the mine, the output was much greater than previously and the average yield was slightly higher, but the fall in the price of tin affected them adversely. The shares in the company are all held firmly by people interested in Cornwall and in the tin trade and there are no dealings in them worth mentioning.

DIVIDENDS.

Name of Company.	Latest Dividend—Date.	Per Share.	Total.	Total to Date.
•Bald Butte, Mont.	Mar. 10	.06	15,000	1,162,148
•Central Lead, Mo.	Mar. 15	.50	5,000	280,000
•Daly-West, Utah.	Mar. 15	.40	60,000	1,447,500
•Empire State, Ida.	Mar. 15	.05	25,277	1,334,169
•Helena, Oregon	Feb. 25	.00½	6,500	131,000
•La Fortuna, Ariz.	Mar. 8	.05	12,500	1,113,500
†National Lead, pf.	Mar. 15	1.75	260,844	12,144,404
Ontario, Utah	Mar. 20	.30	45,000	14,782,000
•Quincy, Utah.	Mar. 15	1.00	125,000	1,100,000
†Republic I. & St. pf.	Apr. 1	1.75	355,371	3,909,080
•Rocco Homestake, Nev.	Mar. 10	.1½	4,500	67,500
•Silver King, Utah.	Mar. 10	.66⅔	100,000	5,050,000
Sta. Marie de Guad, Mex.	Mar. 10	4.43	11,075	314,750
†St. Joe Lead, Mo.	Mar. 10	.15	37,500	3,497,000
West Shore Oil, Cal.	Mar. 1	.05	5,000	25,000
‡Wolverine, Mich.	Apr. 1	2.00	120,000	870,000
Ymir, B. C.	Mar. 3	.24	48,000	288,000

•Monthly. †Quarterly. ‡Semi-annual.

ASSESSMENTS.

Name of Company.	Location.	No.	Delinq.	Sale.	Amt.
Albion	Utah	3	Mar. 19	.....	.04
Andes	Nev.	..	Feb. 10	Mar. 18	.05
Annandale	Utah	..	Feb. 15	Mar. 12	.00½
April Fool	Utah	..	Mar. 24	.....	.05
Boss Tweed	Utah	5	Mar. 27	.....	.02
Brunswick Con.	Cal.	..	Apr. 3	.....	.03
Cadmus	Cal.	..	Mar. 10	.....	.08
Con. St. Gothard	Cal.	20	Mar. 5	Mar. 24	.05
Emerald	Utah	..	Feb. 15	Mar. 12	.00½
Garibaldi	Cal.	2	Mar. 15	.....	.01½
Lady Washington	Nev.	..	Feb. 23	Mar. 20	.03
Marina Marsicano	Cal.	27	Feb. 17	Mar. 10	.02
Mexican	Nev.	..	Mar. 25	Apr. 15	.01
Minnie	Utah	4	Feb. 22	Mar. 25	.001
Northern Light	Utah	7	Mar. 10	Mar. 29	.02
Mistletoe	Cal.	..	Mar. 15	.....	.01
Orient	Utah	2	Feb. 15	Mar. 15	.00½
Pilot	Cal.	..	Mar. 18	.....	.10
Reward	Cal.	..	Mar. 12	.....	.01
Sampson	Utah	..	Mar. 27	.....	.01
Sierra Nevada	Nev.	..	Mar. 25	.....	.10
Silver King	Ariz.	23	Mar. 11	Apr. 8	.25
Sunrise	Utah	1	Feb. 17	Mar. 10	.00¾
United Sunbeam	Utah	3	Mar. 4	Mar. 21	.10
Utah Con.	Nev.	..	Mar. 4	Mar. 6	.05
Willietta	Cal.	4	Mar. 5	Apr. 7	.01
Yellow Jacket	Nev.	..	Feb. 8	Mar. 18	.10
Yuba Con.	Cal.	6	Mar. 24	.....	.03

COAL TRADE REVIEW.

ANTHRACITE.

New York. March 7.

One of the most disastrous floods in the history of anthracite mining in Pennsylvania has caused an almost total suspension of shipments from the Lackawanna, Wyoming and Lehigh regions. The Lehigh River, which did so much damage to the lines of the Lehigh Valley and the Central Railroad of New Jersey last December, went on a rampage again, and quite eclipsed its December record. All the highway bridges between Whitehaven and Mauch Chunk, a distance of 30 miles, are reported swept away, and the railroad bridges are either swept away or weakened; luckily it so happens that along a stretch where a Jersey Central bridge is out the Lehigh Valley has one standing and vice versa. This will facilitate repairs, but at best it will be a week before either road is shipping much coal. The Schuylkill region has suffered from flooded collieries, and there have been washouts along branch lines of the Reading, but the main line is open, and the company has about 26 collieries in operation. A few of the collieries drowned out had just recovered enough from the December flood to start shipping again. In the Wyoming region the Susquehanna River rose over 32 feet, covering the flat between Wilkes Barre and Plymouth, and submerging the bridges.

The Lackawanna Railroad had its bridge across the Delaware at Easton carried away, and the Delaware & Hudson is finding trouble in getting coal forward, owing to a bridge being down on the Erie, between Middletown and Goshen.

Some of the rivers in the anthracite region may have risen higher in past floods, but it is safe to say that they have never caused so much loss. It is quite likely that the total damage to railroads and mines will amount to some millions of dollars. Aside from the great amount of direct damage to railroads from broken bridges and washouts, there is the loss due to the suspension of traffic. As for the mines, the expense of pumping out the flooded workings will be great, shipments in some cases must be suspended for weeks, and on top of these losses is the expense, in some cases the heaviest item of all, of getting the flooded mines in good working shape again. Men who have been connected with the anthracite railroads for 40 years do not remember a worse suspension of shipments from weather causes alone.

Present indications are that there will be no reduction of prices on April 1, and current prices may prevail until May. It is also evident that the matter of labor troubles at the collieries will not be settled promptly if the United Mine Workers persist in the demands made at the Indianapolis convention. Considering the damage done to mines and railroads recently the great producing companies are not likely to submit to requests for higher wages nor look with favor upon demands for an eight-hour day and a minimum wage scale. The chances are, however, if John Mitchell can hold the rank and file of his followers in line, that there will be no strike.

Trade in the Northwest is fairly active. There is probably enough coal on the docks to last until navigation opens. In Chicago territory trade is seasonably good. The supplies on dock have decreased a lot within the past month, and the indications are that there will be but little coal left by the opening of navigation. Arrivals of all-rail coal have been greatly affected by the recent widespread storms. Along the lower lake ports and in all-rail trade farther East demand is affected by weather conditions, and buying is of the hand-to-mouth order. Along the Atlantic seaboard demand has been good. Shipments from the mines are light. Supplies at the New York Harbor shipping ports are scanty. Practically none of the sales agents in New York is looking for business, and several of the roads are to all intents and purposes out of the market. The steam sizes are in very short supply, and as bituminous shipments are interrupted, many manufacturing plants are in urgent need. All talk of a coal famine is, however, premature. If the weather holds mild and there are no further interruptions to traffic, coal enough for all needs will soon be coming forward.

BITUMINOUS.

The Atlantic seaboard bituminous trade, like the anthracite, is suffering from the effects of recent storms. Bad washouts along the main line roads keep coal from coming through or empties from getting back. The only coal available for present needs is that on the shipping port side of the breaks. As a result coal is very scarce and prices are advancing. A current figure is $3 for Clearfield, f. o. b. shipping port, and the price is likely to go higher. It is thought that empties will not begin to arrive at the majority of mines before Monday. This means an interruption in the regular movement of coal of over a week.

As April 1 approaches more contracts for the coming season are being closed. Most of these are at the regular figures, though in a number of cases we hear of advances. Producers of the better grades of coal believe they can easily procure 5@10c. over last year's contract figures and producers of the lower grades are also firm. One contract for a special grade of Clearfield is reported taken at $2.80, f. o. b. shipping port, a considerable advance over last year. There is no such rush of producers to close contracts as in former years.

Consumers in the far East are a little short. Some urgency orders are coming from that quarter and some coal has gone forward, but not enough as yet to satisfy the demand. Along Long Island Sound there is a scarcity of coal, even of the lower grades. Dealers at New York Harbor ports are short and have advanced prices on what is available to all but regular customers. All rail trade is temporarily knocked out by the floods and washouts. Transportation from the mines to tidewater is interrupted and practically no empties are arriving at the mines. All the main lines are seriously affected by the floods. In the coastwise vessel market there are vessels enough for all the coal that is reaching tidewater. We quote current freight rates as follows: Providence, New Bedford and Long Island Sound, 90c.; Boston, Salem and Portland, $1; Wareham and Newburyport, $1.15; Portsmouth, $1.05.

Birmingham. March 3.

(*From Our Special Correspondent.*)

The coal demand is still persistent and the shortage of railroad cars is retarding the production. In some places bad weather has injured the production some, but as a general proposition Alabama's production is heavy. Coal sales have been held back by the scarcity of cars, but the railroads are doing all in their power to move the product as rapidly as they can.

The Alabama Steel and Wire Company has secured deeds to the tract of coal lands purchased from Col. T. H. Aldrich, located near Bessemer, in the lower part of Jefferson County, and will, it is stated, actively develop it.

The Davis Creek Coal and Coke Company, recently organized with W. E. Leake, of Birmingham, president; Henry Parsons, of New York, vice-president; J. C. Maben, Jr., of Birmingham, secretary-treasurer, and I. C. Maben, of New York, assistant secretary-treasurer; capital stock $275,000, of which $200,000 is in common stock; has acquired a large tract of coal lands in Tuskaloosa County, on the Birmingham Mineral Railroad, and will begin work at an early date in developing the same. The company proposes to open mines and construct coke ovens. About 1,000 tons of coal a day will be the output when the mines have been opened in full. W. E. Leake, the president of the company, is an old-time coal operator of Alabama, having heretofore been interested in the Virginia and Alabama Coal Company, and is now president of the Abernant Coal Company, operating a mine in the lower part of the county.

Cleveland. March 5.

(*From Our Special Correspondent.*)

A meeting of the steam coal men has been held in this city for the last two days and is likely to continue during the week. They are interested in making prices which will give them better returns from their operations, as they claim that the scarcity of cars is curtailing production to the point where it is hardly profitable at present prices. It is altogether profitable therefore that the result of the present meeting will be a slight increase in the prices. The meeting here is supposed to represent all of the coal operators in Ohio, Western Pennsylvania and West Virginia. Following this meeting there will be one of the Ohio Coal Traffic Association at which the rates for the movement of coal from mines to the lakes will be determined. There is a disposition to retain the rates which have prevailed for the last year.

Another meeting of coal men will be held March 20, at which the price of coal to be shipped by lake to the Northwest will be fixed. This meeting will likely be followed by a conference between the coal shippers and the vesselmen to determine the rate of lake transportation. The old question of allowing the vesselmen to move the year's coal at a fixed rate per ton is up, but the shippers do not take to the scheme with any degree of relish, and it is possible that it will fall through and old time principles prevail.

The tie-up of the railroads has lessened the supply of domestic coal, and there is a tendency to advance the prices, although no marked increases have been made of late. The consumption now is about equal to the supply.

Pittsburg. March 5.

(*From Our Special Correspondent.*)

Coal.—There is but little change in the coal situation. Most of the railroad mines are in full operation, and the river mines are idle, owing to the high water. Many of them will be started before the end of the week. The Monongahela River Consolidated Coal and Coke Company sustained but little loss during the flood compared with those of the past. Most of the loaded craft was in the pools, amply protected from the ice gorges. The danger is now over, and shipments to the Southern markets will be commenced this week. Some coal was sent out just before the ice broke, and was safe below before the flood came. No action has yet been taken by the two coal combinations on prices, and will not be until the district dead work scale is settled. The conference on this scale between representatives of the United Mine Workers and the operators continued all of last week, and was resumed on Monday. It may continue the rest of the week. The prospects for securing the changes desired by the miners are not very favorable.

Connellsville Coke.—The production and shipment of coke was much improved last week, and the opening of the present week. All the furnaces in the valleys were able to operate nearly to their full capacity. The prices remain unchanged, $2.25 for furnace and $2.75@$3.00 for foundry, although some large premiums were paid during the past few weeks for prompt shipment. The production in the Connellsville region last week, according to the *Courier*, was 217,682 tons, an increase over the previous week of 5,227 tons. The shipments aggregated 10,676 cars, distributed as follows: To Pittsburg and river tipples, 3,895 cars; to points west of Pittsburg, 4,724 cars; to points east of Connellsville, 2,057 cars. This was an increase of 1,588 cars compared with the shipments of the previous week.

Foreign Coal Trade. March 6.

Coal and coke exports from the United States are reported by the Bureau of Statistics of the Treasury Department, as below, for the month of January:

	1901.	1902.	Changes.
Anthracite	194,759	103,242	D. 91,517
Bituminous	417,003	402,225	D. 14,778
Total coal	611,762	505,467	D. 106,295
Coke	34,299	32,609	D. 1,690
Total	646,061	538,076	D. 107,985

The decrease this year was chiefly in anthracite. The destination of the exports is shown in the following table:

	1901.	1902.	Changes.
Canada	414,200	305,643	D. 108,557
Mexico	40,528	41,022	I. 494
Cuba	50,590	43,294	D. 7,296
West Indies	39,323	44,537	I. 5,214
Europe	23,859	35,759	I. 11,900
Other countries	43,262	35,212	D. 8,050
Total	611,762	505,467	D. 106,295

The decrease in exports to Canada was chiefly in anthracite. The coke exported went principally to Mexico.

Recently there have been some good charters taken at advantageous terms. The rates booked from Baltimore and Norfolk to Genoa, Italy, ranged from 7s. 6d. to 7s. 9d. ($1.80@$1.86), sailing up to April 15. These rates are somewhat less than were taken in January to the same port.

Messrs. Hull, Blyth & Co., of London and Cardiff, report under date of February 21 that the tone of the Welsh coal market remains exceedingly depressed for all descriptions of coal. Quotations are: Best Welsh steam coal, $3.60@$3.72; seconds, $3.48; thirds, $3.38; dry coals, $3.38; best Monmouthshire, $3.30@$3.36; seconds, $3.24; best small steam coal, $2.16; seconds, $1.92; other sorts, $1.74.

The above prices for Cardiff coals are all f. o. b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f. o. b. Newport, exclusive of wharfage, but inclusive of export duty, and are for cash in 30 days, less 2 1-2 per cent discount.

The general tone of the freight market is firm, with a considerable amount of business passing. Mediterranean rates show some improvement. Some rates quoted from Cardiff are: Algiers, $1.30; Marseilles, $1.40; Genoa, $1.44; Naples, $1.44; Port Said, $1.38; Singapore, $2.76; Las Palmas, $1.44; St. Vincent, $1.62; Rio Janeiro, $2.58; Santos, $2.88; Buenos Aires, $2.34.

IRON TRADE REVIEW.

New York. March 7.

Owing to the recent severe storms and floods business is almost at a standstill. Railroad transportation and the mail service have been seriously affected. From advices received, it is learned that the demand for most iron and steel products is good, and some large orders for foundry iron for the second half of the year have been taken. Prices are firm, and for early delivery, sellers ask a substantial premium.

The imports of iron ore into the United States in January are given as 63,521 tons, against 33,353 tons last year, showing an increase of 30,168 tons. The ore received this year came largely from the West Indies.

Birmingham. March 3.

(*From Our Special Correspondent.*)

The Alabama pig iron market is so active that the furnacemen can do nothing but withdraw furnace after furnace from the open market to prevent overselling. As has been stated before, sales are being made in this State on which delivery is to be made the latter part of the year. It is stated that during the month of February the aggregate amount of iron sold was 200,000 tons, which is an unusual amount. The railroads are slow again in supplying all the cars with which to move the products that are needed.

Prices are firm with an upward tendency. It is an open secret that premiums are being paid for immediate delivery iron and some grades are bringing a better price. No. 2 foundry is bringing $12 easily, and the statement was made recently that some furnaces were holding out for a better price than this.

Local consumption is heavy. The foundrymen who have been in the habit of buying in small quantities placed some orders ahead a few months ago, and as far as can be heard were well protected.

The following quotations are given: No. 1 foundry, $12.50; No. 2 foundry, $12; No. 3 foundry, $11@$11.50; No. 4 foundry, $10.50@$11; gray forge, $10.50; No. 1 soft, $12.50; No. 2 soft, $12.

In finished iron and steel circles there is no cessation of the activity. Some machinery broke down in the Birmingham rolling mills the first of the past week, but the same has been repaired and before the middle of the week full operation will be the order of the day. A number of experienced mill men have been brought to the Birmingham district to go to work in the mills here, and the various departments will be put on double turn.

A rumor is heard that the Alabama Steel and Wire Company is preparing to supply itself with fuel and later on with steel. Coal lands have been purchased already quite extensively in the State, while a deal is on for the purchase of a large tract of ore land.

Foundrymen and machine shop proprietors report steady work in their line. Some healthy inquiries are being made of them also looking to future work.

Buffalo. March 4.

(*Special Report of Rogers, Brown & Co.*)

Whatever may be the final result, there is every appearance at present that furnaces are not interested in securing new business. So far as possible they are anxious to protect old customers with such tonnage as they need, at conservative prices. The liberal total of such sales is rapidly filling up order books until the end of 1902. No change in market conditions has been noted during the week. We quote below on the cash basis, f. o. b. cars Buffalo: No. 1 strong foundry coke iron, Lake Superior ore, $18.25; No. 2 strong foundry coke iron, Lake Superior ore, $17.75; Southern soft No. 1, $17.75; Southern soft No. 2, $17.25; Lake Superior charcoal, $20.50.

Cleveland. March 5.

(*From Our Special Correspondent.*)

Iron Ore.—The ore shippers who bring comparatively small quantities down the lake each year have about covered their needs for vessel tonnage and have obtained about 4,000,000 tons carrying capacity. They will likely charter no boats until something more definite is known about the amount of ore to be left on the docks this spring. It is believed the ore piles will be better stocked this spring than ever before, hence it will be necessary to ship less ore this summer. This is causing the big shippers to go slow in making season contracts. The charters so far made have been on the basis of 80c. between Duluth and Ohio ports. The reports are now that the sales of ore have about all been made for the year, on the basis of $4.25 for bessemer old range, $3.25 for non-bessemer old range and bessemer Mesabi, and $2.75 for non-bessemer Mesabi.

Pig Iron.—The supply of coke is still limited and while most furnaces are in blast the production is evidently curtailed. Foundry grades are scarcely to be had at present, but those who have any material for quick shipment are getting their own prices, buyers offering large premiums. Foundry pig is being offered on contract for the fourth quarter only, the quotations being $17.50@$17 for Nos. 1 and 2, respectively, in the Valley. No bessemer sales have been recorded, but the quotation is nominally $16, Valley furnace, which also applies on basic. Neither bessemer nor basic producers have any iron left for the third quarter delivery.

Finished Material.—During the past week the steel mills made an advance of $2 on the price of iron and steel bars, the present quotation being 1.60c. Pittsburg for bessemer steel bars, and 1.70c. Pittsburg for open-hearth steel bars, and 1.70c. Pittsburg for iron bars. Since the advance the sales have been extraordinarily heavy, and the mills are well filled up for the future. Many of the producers of structural steel have retired from the market for the present and are now offering steel only after the first of December. The price does not change. The mill men admit that they will have some steel during the summer, which has not been sold, but say that this is being held to meet emergencies. Plates are in big demand with deliveries on sheared plates possible in 30 days and on universal mill plates in 60 or 70 days. Prices hold at 1.70c. Billets and sheet bars are very scarce. Those who are depending on the market will be compelled to suspend operations unless some relief comes from abroad. There is no business now upon which to base a quotation. Rail sales have stopped altogether for the present. Sheets are being sold on the same old basis of 3.45@3.60c. for No. 27 one pass cold rolled, with a general tendency to advance store prices. Mill sales here are very light. The dealers out of stock have advanced the price of wrought pipe slightly, but the business has hardly started for the year.

Old Material.—The scrap sales are quite heavy now with some delay in deliveries. Steel rails, $17; old car wheels, $17; old iron axles, $22; old iron rails, $22; heavy steel, $17; cast scrap, $14; No. 1 wrought, $18; cast borings, $8; wrought turnings, $13.75.

Philadelphia. March 6.

(*From Our Special Correspondent.*)

Pig Iron.—The extremely inclement weather has interfered with business to a very material extent. Storms and floods throughout the State have shut down mills and delayed the delivery of supplies. However, trade conditions are in excellent shape, consumption of iron is increasing rather than diminishing, the anxiety to place orders is as strong as ever and for anything like so-called early deliveries, premiums have to be paid. An advance of 50c. is quite general. Last week's quotations may be said to hold to-day for publication. Every purchase and sale is based upon special prices made between the parties. There are rumors of a further advance in bessemer as well as basic. Such brands as foundry iron are hard to get. Forge is being worked up rapidly. Stocks in hand are small.

Steel Billets.—Several lots of billets are wanted, or, rather would be ordered if other things were favorable, but for the present the action of buyers awaits further developments.

Bar Iron.—The advance on bars has not influenced buying in the least. In fact, the weather has been such that very little selling has been reported at stores. The users have all along been carrying a fair stock and so are not suffering. The bar mills have been interrupted a good deal of late and output is reduced. Prices are higher than the advanced quotations show where prompt deliveries are insisted upon. Car builders are again buying, but for late delivery.

Skelp Iron.—Buyers have not been heard of for a few days. Western activity is reflected here. Mills have all the work they can handle.

Sheet.—The only urgent demand this week has been for heavy galvanized for local needs. The orders booked were at outside quoted rates.

Merchant Steel.—Agents of mills are quite encouraged. While there is no March rush stocks are depleted. Agents say there will be no concessions.

Pipes and Tubes.—The demand for tubes has temporarily abated, but the position of manufacturers is unchanged. All who were seen this week reiterate previous rumors. Prices are maintained. The mills are busy, except where obstructed by flood.

Plates.—There is no change, but orders are fewer and smaller.

Structural Material.—The mill managements are standing off, evading new work where they can, where deliveries are difficult. Local building requirements will be quite an important feature this year.

Steel Rails.—Some railroad requirements which did not develop until autumn will not be easily taken care of. A good deal of new work was resolved upon since January 1. Prices are the same. There are orders, or rather inquiries, for girder rails, but there is the same trouble over getting them placed.

Old Rails.—Terms have finally been reached relative to large deals in old iron and steel rails.

Scrap.—Scrap is selling at high figures for small lots for future delivery.

Pittsburg. Mar. 5.

(*From Our Special Correspondent.*)

The big flood, which reached the highest point on Saturday night, entirely closed, or affected almost all the iron and steel mills and blast furnaces in the Pittsburg District. Plants along the Allegheny and Ohio Rivers were more seriously crippled than those on the Monongahela River. The big Carnegie works at Homestead, Braddock and Duquesne were not closed more than 24 hours. The mills and furnaces of Jones & Laughlins, Limited, and the plants of the American Steel & Wire Company at Braddock and Rankin were being operated as usual on Monday. The Black Diamond works of the Crucible Steel Company of America were the first to resume in the Allegheny river mill district. It is expected that the plants of Zug & Co., Brown & Co., Carnegie's upper and lower union mills, American Steel & Wire Company, American Steel Hoop Company and other plants in the flooded section will be in full operation again to-morrow. The Star and Monongahela were the only tin-plate plants closed by the high water. A heavy tonnage in all lines of finished material was lost by the enforced suspension of operations.

The pig iron market is quiet this week, and no large sales were made, one cause being that the prices were put at the prohibitive point. Basic iron is practically out of the market, as $18, Pittsburg, is being asked, which is more than a dollar a ton higher than the association price for bessemer. Foundry iron is scarce on account of buyers placing orders for months ahead in anticipation of boom prices. Some of the furnaces are out of the market for the present. One Southern concern is in the market again for delivery after August 1, and is quoting No. 2 foundry at $12.50 at the furnaces, or $16.65 delivered at Pittsburg. Last week was the best the Valley furnaces have had for a long time. All were in operation again, and received the full requirement of coke. No difficulty is reported so far this week on account of a shortage of coke due to the crippling of the railroads by reason of the flood. It is probable that the furnaces will not be affected at all, as many received more coke than was needed before shipments were curtailed by the high water. Nothing definite has yet been done by the International Association of Blast Furnace Employes looking to the enforcement of the demands for three shifts instead of two, which will increase the labor cost 50 per cent. The matter has not been dropped, and the demand likely will be made during the week. One of the American Federation of Labor leaders intimated to your correspondent that it is possible to avert all trouble by a compromise, the men accepting an advance in wages and continuing to work the same number of hours. The workers' organization has no foothold in the Pittsburg District, and will make no demands outside of the Mahoning and Shenango Valleys.

The steel bar and iron bar interests are asking $2 a ton more than the fixed price on all new business offered. This is done to prevent a boom, and is not a violation of the pooling agreement which fixed the minimum price at which bars should be sold. The mills are well sold up for the rest of the year. Several thousand tons of bessemer steel billets were sold during the week, and some large orders were placed here for German billets and sheet bars. The foreign business was done by C. T. Needham, representing John Needham & Sons, of Manchester, Eng., who spent several days in Pittsburg. The amount of tonnage placed and the prices were not made public.

The wire nail interests met in Chicago during the week, and reaffirmed prices. The cut nail manufacturers are to meet this week, and it is believed prices will be advanced from $1.95 to $2 or $2.05, the price of wire nails. In this event an increase in the price of wire nails may be expected.

Pig Iron.—No sales of bessemer pig iron are recorded this week, and prices are firm at $16.50@$16.75, Valley furnaces. Basic iron is quoted at $18, Pittsburg. Gray forge continues in heavy demand. The most important sale was 1,500 tons at $16.75, Pittsburg, for delivery in the last quarter. Several thousand tons of foundry No. 2 were sold for second half delivery at $17.00@$17.50, Pittsburg.

Steel.—Some large orders for German steel were placed in the Pittsburg District this week. Several thousand tons of bessemer steel billets were sold at $31.50, delivered at Pittsburg during the second half. Steel bars are firm at 1.50@1.60c., and tank plate is still quoted at 1.60c.

Sheets.—The market continues very firm, and No. 28 gauge is quoted by the American Sheet Steel Company at 3.10@3.20c., while independent concerns are asking from $2.00@$3.00 a ton more. Galvanized sheets are extremely firm at 70 and 10 per cent off.

Ferro-manganese.—The principal producers continue to quote 80 per cent domestic at $52.50.

New York. Mar. 7.

Pig Iron.—Northern irons are firm at the advance. Everything indicates that some furnaces have sold more than they can deliver. We quote for tidewater delivery: No. 1X foundry, $18.25@$18.75; No. 2X, $17.75@$18.25; No. 2 plain, $17.25@$17.85; gray forge, $16.75@$17.25. For Southern iron on dock, New York, No. 1 foundry, $16.25@$16.75; No. 2, $15.75@$16.50; No. 3, $15.25@$15.75; No. 4, $14.75@$15.25; No. 1 soft, $16.50@$16.75; No. 2, $15.75@$16.25.

Bar Iron and Steel.—The market continues active. We quote 1.63c. for common bars in large lots on dock; refined bars, 1.73c.; soft steel bars, 1.73c.

Plates.—Demand continues strong. Present indications are that prices will be advanced $2 per ton within a few days. We quote for tidewater delivery in car-loads: Tank, ¼-in. and heavier, 1.78c.; flange, 1.88c.; marine, 1.98c.; universal, 1.78c.

Steel Rails and Rail Fastenings.—With mills full of orders for months ahead the only matter of interest now is the probability of considerable imports. Stan-

dard sections are still quoted at $28 at Eastern mills; light rails at $28@$30, according to weight. Spikes are 1.80c.; splice bars, 1.68c.; bolts, 2.70@2.80c.

Structural Material.—Demand shows no signs of falling and the tonnage imported promises to be larger than anticipated. We quote for large lots at tidewater as follows: Beams, 1.80@1.95c.; tees, 1.85c.; angles, 1.80c.

CHEMICALS AND MINERALS.

(For further prices of chemicals, minerals and rare elements, see page 372.)

New York. Mar. 6.

Heavy Chemicals.—Demand is good, and shipments more regular, though there is still a shortage of railroad cars. Prices show little change, as large buyers are taking goods on contracts made some time ago. Quotations per 100 lbs. are: High-test alkali, domestic, 75@80c., f. o. b. works, and foreign, 90@92½c. in New York; high-test caustic soda, domestic, $1.95@$2, f. o. b. works, for early shipment, and $1.90@$1.95 for futures; domestic ordinary bicarb. soda, $1, f. o. b. works, and $3 up for better grades; sal soda, 55c., f. o. b. works; bleaching powder, Continental, $1.70@$1.75, and Liverpool brands, $1.80@$1.87½ for early delivery, and $1.75@$1.85 for new contracts; chlorate of potash, spot, $8@$8.25 for powdered and $8.37½@$8.50 for crystals, and forward domestic contracts, $7.75, f. o. b. works.

Acids.—Quiet. Blue vitriol firmer. In January the exports of copper sulphate from the United States amounted to 3,100,360 lbs., against 4,570,435 lbs. last year; showing a decrease of 1,470,075 lbs., owing chiefly to the small demand in Italy.

Quotations are per 100 lbs. as below, unless otherwise specified, for large lots in carboys or bulk (in tank cars), delivered in New York and vicinity:

Acetic, com'l 28%.....	$1.80	Oxalic, com'l.....	$4.75@5.00
Blue Vitriol....	4.37½@4.62½	Sulphuric, 50 deg., bulk ton.....	14.00@16.00
Muriatic, 18 deg.....	1.50	Sulphuric, 60 deg.....	1.00
Muriatic, 20 deg.....	1.62½	Sulphuric, 60 deg., bulk	18.00@20.00
Muriatic, 22 deg.....	1.75	Sulphuric, 66 deg.....	1.20
Nitric, 36 deg.....	4.00	Sulphuric, 66 deg., bulk	21.00@23.00
Nitric, 38 deg.....	4.25		
Nitric, 40 deg.....	4.50		
Nitric, 42 deg.....	4.87½		

Brimstone.—The market continues firm at $24@$24.50 per ton for spot best unmixed seconds, and $23@$23.25 for shipments. Best thirds are worth $20.50, and current thirds, $19.50 for shipments. Imports show a heavy falling off from last year. In January the United States received only 8,806 tons as against 18,387 tons last year. This decrease of 9,581 tons is due chiefly to the high prices.

Pyrites.—The high brimstone market has favored increased imports of pyrites. In January the United States imported 38,113 tons of pyrites, as compared with 27,402 tons last year. The good demand has kept quotations for pyrites steady.

Quotations are f. o. b.: Mineral City, Va., lump ore, $5 per ton, and fines, 10c. per unit; Charlemont, Mass., lump, $5, and fines, $4.75. New York and other Atlantic ports. Spanish pyrites contain from 40 to 51 per cent of sulphur; American, from 42 to 44 per cent.

Commenting on the high prices ruling for brimstone, Mr. Solon J. Vlasto, a leading importer of New York, states that the fall of nearly 100,000 tons in the exports from Sicily last year shows that unless the trust soon decides to materially reduce prices and encourage consumption, the history of other trusts that have followed its policy will be repeated. The United States in 1901 was the largest consumer of brimstone in the world, taking more than one-third the total quantity exported from Sicily. As compared with 1900, however, the shipments to this country had fallen off over 20,000 tons. On the other hand the prices paid by the American manufacturer during 1901 averaged $22.50 per ton, while previous to the formation of the trust, they were only $16 and $19. At ruling high prices the profits of the syndicate are large, for when sulphur sold at $20 there was a profit of over $3 per ton or nearly $1,500,000 on a capital of less than $3,500,000. Moreover, in 5 years the trust paid 43 3-4 per cent in dividends. Mr. Vlasto thinks that with the accumulation of stocks at shipping ports in Sicily the time is not very distant when we shall be purchasing sulphur at much less than current prices.

Nitrate of Soda.—The New York market continues strong at $2.30 per 100 lbs. for spot, $2.25 to arrive, and $2.02½@$2.10 for shipments, according to position. Large consumers are not purchasing to any extent, believing prices will recede later.

Phosphates.—There has been rather active chartering for the foreign market, and among the other fixtures made we note 14s. 3d. ($3.46) from Fernandina to Stettin, Germany, and 16s. 6d. $3.86) from Tampa to Helsingborg, Sweden, both March sailing. There was also a charter booked for April sailing from Tampa to St. Nazaire, France, at 15s. ($3.60). Abroad it is reported that important sales of high grade Florida rock for this year's delivery have been made at 6¼d. per unit ($9.75), c. i. f. United Kingdom, and at similar prices for the various Continental and Baltic ports. Next year's business, however, cannot be done at this figure, as sellers are asking an advance. Florida land pebble is offering at 4¾d. per unit ($6.65), c. i. f. United Kingdom or North Sea ports. Tennessee and South Carolina rock are nominally unchanged.

We quote phosphate prices below:

Phosphates.	Per ton F. o. b.	C. i. f. Un. Kingdom or European Ports. Unit.	Long ton.
*Fla. hard rock (77@80%)....	$7.50	6¼@7d	$9.75@10.92
*Fla. land peb. (68@73%)....	3.00@3.25	4¾@5d	6.65@ 7.00
*Fla. Peace Riv. (58@63%)..	2.25@2.50	4¾@5d	5.70@ 6.00
†Tenn. (78@80%) export.....	3.50	6¾@7d	10.53@10.92
†Tenn., 78% domestic.....	3.00@3.25	.....	.....
†Tenn., 75% domestic.....	2.75@3.00	.....	.....
†Tenn., 73@74% domestic....	2.40	.....	.....
†Tenn., 70@72% domestic....	2.10@2.25	.....	.....
‡So. Car. land rock.....	3.25	4½@5d	5.67@ 6.30
‡So. Car. river rock.....	2.75@3.00	.....	.....
Algerian, rock (63@70%)....	.....	6@6¼d	8.04@ 8.70
Algerian, rock (58@63%)....	.....	5@5¼d	6.00@ 6.30
Tunis, Gafsa (58@63%).....	.....	5@5¼d	6.00@ 6.30

*Fernandina, Brunswick or Savannah. †Mt. Pleasant. ‡On vessels Ashley River.

Liverpool. Feb. 22.

(Special Report of Joseph P. Brunner & Co.)

Export business in the heavy lines of chemicals is rather disappointing, but values are without quotable change.

Soda ash is moving off for home trade requirements, but the export inquiry is only moderate. We quote nearest spot range for tierces about as follows: Leblanc ash, 48 per cent, £5 15s.@£6; 58 per cent, £6 2s. 6d.@£6 7s. 6d. per ton, net cash. Ammonia ash, 48 per cent, £4 5s.@£4 10s.; 59 per cent, £4 10s.@£4 15s. per ton, net cash. Bags, 5s. per ton under price for tierces. Soda crystals are fairly brisk at generally £3 7s. 6d. per ton, less 5 per cent for barrels, or 7s. less for bags, with special terms for certain export markets. Caustic soda is in moderate demand at late rates. We quote spot range as follows: 60 per cent, £8 15s.; 70 per cent, £9 15s.; 74 per cent, £10 3s.; 76 per cent, £10 10s. per ton, net cash.

Bleaching powder is inactive, and for hardwood £6 15s.@£6 17s. 6d. per ton, net cash, is about the nearest value, with special terms for Continental and a few other export quarters.

Chlorate of potash is neglected, but quotations are without change at 3d.@3⅛d. per pound, net cash.

Bicarb soda is steadily maintained at £6 15s. per ton, less 2½ per cent for the finest quality in 1 cwt. kegs, with usual allowances for larger packages, also special terms for a few favored markets.

Sulphate of ammonia is in request and dearer at £11 15s.@£11 17s. 6d. per ton, less 2½ per cent. for good gray 24@25 per cent in double bags f. o. b. here.

Nitrate of soda is firmly held and selling to a moderate extent on spot at £10 10s.@£10 15s. per ton, less 2½ per cent for double bags f. o. b. here, as to quality and quantity.

METAL MARKET.

New York. Mar. 6.

GOLD AND SILVER.

Gold and Silver Exports and Imports.

At all United States Ports in January and Year.

Metal	January. 1901.	January. 1902.	Year. 1901.	Year. 1902.
Gold.				
Exports....	$8,221,159	$1,973,675	$8,221,159	$1,973,675
Imports....	4,265,626	1,404,787	4,265,626	1,404,787
Excess.	E. $3,955,533	E. $568,888	E. $ 3,955,533	E. $ 568,888
Silver,				
Exports....	$4,790,239	$4,509,213	$ 4,790,239	$ 4,790,239
Imports....	3,189,318	2,107,681	3,189,318	3,189,318
Excess.	E. $1,600.921	E. $2,401,532	E. $1,600,921	E. $2 401,532

These figures include the exports and imports at all United States ports, and are furnished by the Bureau of Statistics of the Treasury Department.

Gold and Silver Exports and Imports, New York.

For the week ending March 6, 1902, and for years from January 1, 1902, 1901 and 1900.

Period.	Gold. Exports.	Gold. Imports.	Silver. Exports.	Silver. Imports.	Total Excess Exports or Imports.
Week...	$1,515,228	$204,235	$159,965	.....	E. $1,470,918
1902.....	8,799,924	511,107	7,941,090	$234,000	E. 15,995,907
1901.....	9,028,520	614,753	7,020,420	710,439	E. 14,723,748
1900.....	2,373,136	989,289	7,535,179	803,882	E. 8,115,194

The gold exported went chiefly to Paris, while the silver was principally for London. The gold imported was largely from France, and intended for shipment to Cuba; there was no silver received.

Financial Notes of the Week.

General business is regular, while the speculative markets are uninteresting. Continued heavy shipments of gold do not appear to disturb the money market. These shipments are for Paris, and so far this week $3,300,000 has been engaged. This amount will probably be increased by Saturday.

The statement of the New York banks, including the 63 banks represented in the Clearing House, for the week ending March 1, gives the following totals, comparison being made with the corresponding weeks of 1901 and 1900:

	1900.	1901.	1902.
Loans and discounts..	$755,076,100	$914,209,400	$938,191,200
Deposits	829,917,000	1,012,514,000	1,017,488,300
Circulation	18,574,300	31,309,000	31,208,700
Specie	158,177,900	193,948,500	192,433,500
Legal tenders	62,942,900	73,981,100	71,914,500
Total reserve	$221,120,800	$267,929,600	$264,348,000
Legal requirements...	207,479,250	253,128,500	254,372,075
Balance surplus ...	$13,641,550	$14,801,100	$9,975,925

Changes for the week, this year, were increases of $1,433,600 in loans and discounts, and $34,400 in circulation; decreases of $1,985,900 in deposits, $2,465,400 in specie, $511,800 in legal tenders, and $2,480,725 in surplus reserve.

The following table shows the specie holdings of the leading banks of the world at the latest dates covered by their reports. The amounts are reduced to dollars, and comparison is made with the holdings at the corresponding date last year:

	1901. Gold.	1901. Silver.	1902. Gold.	1902. Silver.
N. Y. Ass'd..	$193,948,500	.....	$192,433,500	.....
England	179,294,725	.....	189,261,415	.....
France	476,364,240	$218,848,725	500,770,380	$220,881,375
Germany	150,270,000	73,185,000	197,265,000	72,960,000
Spain	70,005,000	82,475,000	70,235,000	87,815,000
Netherlands...	25,215,000	28,706,500	28,658,000	32,656,000
Belgium	14,665,000	7,330,000	15,683,335	7,841,665
Italy	77,085,000	9,321,000	79,595,000	10,612,000
Russia	368,410,000	33,460,000	355,470,000	35,515,000

The returns of the Associated Banks of New York are of date March 1, and the others February 27, as reported by the *Commercial and Financial Chronicle* cable. The New York banks do not report silver separately, but specie carried is chiefly gold. The Bank of England reports gold only.

Owing to limited inquiry the silver market has not been broad enough to sustain the price, so that the week closes with lower prices.

Receipts of silver at the United States Assay Office in New York for the weeking ending March 6 were 24,000 oz.

Shipments of silver from London to the East for the year up to February 20, are reported by Messrs. Pixley & Abell's circular as follows:

	1901.	1902.	Changes.
India	£1,340,500	£1,252,320	D. £88,180
China	74,875	11,500	D. 63,375
The Straits	48,976	.....	D. 48,976
Totals	£1,464,351	£1,263,820	D. £200,531

Arrivals for the week, this year, were £165,000 in bar silver from New York, £16,000 from Chile, £7,000 from the West Indies and £38,000 from Australia; total, £226,000. Shipments were £242,000 in bar silver to Bombay, and £5,000 to Calcutta; total, £247,000.

The coinage executed at the mints of the United States in February and the two months this year, is reported by the Bureau of the Mint as below:

Denomination.	February. Pieces.	February. Value.	Jan.-Feb. Value.
Double Eagles.....	328,000	$6,560,000	$14,220,000
Quarter Eagles.....	33,540	83,850	83,850
Total gold.....	361,540	$6,643,850	$14,030,850
Dollars	1,536,000	1,536,000	3,836,000
Half-dollars	1,262,000	631,000	837,637
Quarter-dollars	896,000	224,000	544,000
Dimes	980,000	98,000	180,000
Total, silver.....	4,674,000	$2,489,000	$5,397,637
Five-cent nickels.....	1,597,000	79,850	185,850
One-cent bronze..... ...	4,864,000	48,640	132,550
Total, minor.....	6,461,000	128,490	$318,400
Total coinage.....	11,496,540	$9,261,340	$20,019,887
Coinage, 1901.....	12,154,764	11,588,966	27,112,646

The falling off in the two months, this year, is equal to $6,092,759, chiefly in gold coinage.

The Treasury Department's estimate of the amount and kinds of money in the United States on March 1, is as follows:

	Total.	In Treasury.	In Circulation.
Gold coin (including bullion in Treas'y.	$1,178,031,493	$238,821,209	$633,454,585
Gold certificates	.....	.....	305,755,690
Silver dollars	534,606,654	21,430,836	69,378,522
Silver certificates	.....	.....	433,797,296
Subsidiary silver	92,859,794	9,418,003	83,441,791
Treasury notes, 1890	35,346,000	177,610	35,168,390
U. S. notes	346,681,016	11,278,286	335,402,730
Currency certif.	.....	.....	.....
Nat. bank notes	358,434,867	10,864,621	347,570,246
Total	$2,545,959,824	$291,990,565	$2,253,969,259

Population of the United States March 1, 1902, estimated at 78,663,000; circulation per capita, $28.65. For redemption of outstanding certificates an exact equivalent in amount of the appropriate kinds of money is held in the Treasury, and is not included in the account of money held as assets of the Government.

This statement of money held in the Treasury as assets of the Government does not include deposits of public money in national bank depositaries to the credit of the Treasurer of the United States, and amounting to $107,817,083.

The amount reported in circulation on March 1 is $5,982,450 less than on February 1, but $63,360,115 greater than on March 1, 1901.

Prices of Foreign Coins.

	Bid.	Asked
Mexican dollars	$0.43½	$0.45½
Peruvian soles and Chilean pesos	.40	.44
Victoria sovereigns	4.85	4.88
Twenty francs	3.84	3.88
Twenty marks	4.73	4.85
Spanish 25 pesetas	4.78	4.82

OTHER METALS.

Daily Prices of Metals in New York.

Feb. Mar.	Sterling Exchange	N. Y. Cts.	London Pence.	Silver Lake Cts. per lb.	Copper Electrolytic per lb.	Copper London £ per ton.	Tin, cts. per lb.	Lead cts. per lb.	Spelter N.Y. cts. per lb.	Spelter St. L. cts. per lb.
28	4.87¾	55⅛	25⅜	12¼ @12⅜	12 @12¼	55	25¼	4.05 @4.10	4.27½	4.12½
1	4.87⅝	55⅛	25⅜	12¼ @12⅜	12 @12¼	....	25⅜	4.05 @4.10	4.25	4.10
2	4.87¾	55⅛	25 7/16	12¼ @12⅜	12 @12⅛	53¾	25⅜	4.05 @4.10	4.25	4.10
4	4.87¾	55	25 5/16	12¼ @12⅜	12 @12¼	54	25½	4.05 @4.10	4.25	4.10
5	4.87⅝	54⅞	25 5/16	12¼ @12⅛	12 @12⅛	54¼	25⅛	4.05 @4.10	4.25	4.10
6	4.87⅝	54¾	25 5/16	12¼ @12⅛	12 @12⅛	54	25¾	4.05 @4.10	4.25	4.10

London quotations are per long ton, (2,240 lbs.) standard copper, which is now the equivalent of the former g. m. b's. The New York quotations for electrolytic copper are for cakes, ingots or wirebars; the price of electrolytic cathodes, is usually 0.25c lower than these figures.

Copper.—Aside from a good inquiry for spot copper which developed owing to the delay of shipments on account of the storms, the market has been dull and uninteresting, and without any special feature. Exports continue on a large scale. At the close, we quote lake copper at 12¼@12½c.; electrolytic in ingots, cakes and wire bars, at 12@12⅛c, in cathodes at 11¾@11⅞c.; casting copper at 12@12⅛c.

The foreign market, which closed last week at £55, opened on Monday at £53 15s., and the closing quotations are cabled as £54 2s. 6d.@£54 5s. for spot, £53 17s. 6d.@£54 for three months.

Statistics for the second half of February show an increase in the visible supplies of 1,800 tons.

Refined and manufactured sorts we quote: English tough, £59@£59 10s.; best selected, £59@£60; strong sheets, £69@£69 10s.; India sheets, £68@£68 10s.; yellow metal, 6⅛@6¼d.

Exports of copper from New York and Baltimore for the week ending March 5 are reported by our special correspondents as follows: To Great Britain, 859 tons; Germany, 225; Holland, 933; France, 205; Belgium, 35; Italy, 51; total, 2,308 tons. Also 206 tons matte to Great Britain. Imports were 483 tons, of which 25 tons were from Japan.

Imports of copper into the United States in January are reported by the Treasury Department as follows, in long tons:

	1901.	1902.	Changes.
Copper ores and matte	5,414	4,188	D. 1,226
Copper bars, etc	2,566	1,412	D. 1,154

As the return does not separate copper ores and matte, it is impossible to estimate the total quantity of fine copper included.

Tin.—Has been quite active, spot being rather scarce and commanding a premium. All advices from the East at present seem to point to some decrease in the supplies from that quarter, while consumption in Europe, as well as in the United States, seems to be larger than ever. Statistics for the month of February show a decrease in the visible supplies of 1,600 tons. At the close, we quote spot tin at 25¾c.; April, 25¼@25½c.; May, 25@25¼c.; June, 24⅝@24¾c.

The foreign market, which closed last week at £115, opened on Monday at £113 10s., but advanced again, and the closing quotations are cabled as £114 10s.@£114 12s. 6d. for spot, £111 10s.@£111 12s. 6d. for three months.

Imports of tin into the United States in January are reported as follows, in long tons of 2,240 lbs.:

	1901.	1902.	Changes.
Straits	1,126	2,382	I. 1,256
Australia	35	....	D. 35
London	2,130	1,045	D. 1,085
Holland	11	35	I. 24
Other countries	12	31	I. 19
Total	3,314	3,493	I. 179

The increase this year was wholly in shipments direct from the East, the receipts by way of London showing a heavy decrease.

Lead.—Is dull and unchanged. The ruling quotations are 4@4.05c. St. Louis, 4.05@4.10c. New York.

The foreign market is somewhat easier, Spanish lead being quoted at £11 10s.@£11 11s. 3d., English lead, £11 12s. 6d.@£11 13s. 9d.

Imports of lead in all forms into the United States in January, and re-exports of imported lead are stated by the Bureau of Statistics of the Treasury Department as below, in short tons of 2,000 lbs.:

	1901.	1902.	Changes.
Lead, metallic	58	631	I. 573
Lead in ores and base bullion	17,316	10,053	D. 7,263
Total exports	17,374	10,484	D. 6,690
Re-exports	11,047	7,697	D. 3,350
Balance	6,327	2,987	D. 3,340

Of the lead imported this year 9,831 tons (93.8 per cent of the total) were from Mexico and 712 tons (6.2 per cent) from Canada. In addition to the foreign lead re-exported, there were 4 tons of domestic lead exported this year, against 567 tons in January last year.

St. Louis Lead Market.—The John Wahl Commission Company telegraphs us as follows: Lead is unchanged at 4.05c., which appears to be the price for both Missouri and argentiferous brands. Trading is light.

Spelter.—Is without any special feature. We quote the market 4.10c. St. Louis, 4.25c. New York.

The foreign market is quiet, but steady, good ordinaries being quoted at £18, specials at £18 5s.

Exports of spelter or metallic zinc from the United States in January were 410 short tons, against 56 tons in January, 1901. Exports of zinc ores were 2,645 tons, against 3,061 tons last year; showing a decrease of 416 tons this year.

St. Louis Spelter Market.—The John Wahl Commission Company telegraphs us as follows: Spelter is firm but dull at 4.10@4.12 1-2c. according to brand and delivery.

Antimony.—Is unchanged. We quote Cookson's at 9¾@10c.; Hallett's, 8@8⅛c.; Hungarian, Italian, Japanese and U. S. Star, at 7¾c.

Imports of antimony into the United States in January are reported as follows, in pounds:

	1901.	1902.	Changes.
Metal and regulus	383,453	249,743	D. 133,714
Antimony ore	37,115	138,263	I. 101,148

There was a large decrease in metal, but a large increase in ores imported.

Nickel.—The price continues firm at 50@60c. per lb., according to size and terms of order.

Exports of nickel, nickel oxide and nickel matte from the United States in January are reported as 397,283 lbs., against 539,143 lbs. in January, 1901; a decrease of 141,860 lbs. this year.

Platinum.—Consumption continues good. Ingot platinum in large lots brings $19.50 per oz., in New York.

Chemical ware (crucibles and dishes), best hammered metal from store in large quantities, is worth 82c. per gram.

Imports of platinum into the United States in January were 451 lbs., against 659 lbs. in January, 1901; a decrease of 208 lbs. this year.

Quicksilver.—The New York price continues $48 per flask for large lots, with a slightly higher figure for small orders. In San Francisco quotations are firm at $47.50@$48 for domestic orders, and $44 for export. The London price is £8 15s. per flask, with the same figure quoted from second hands.

Exports of quicksilver from all United States ports in January were 54,205 lbs., against 54,728 lbs. in January, 1901; a decrease of 523 lbs. only.

Minor Metals and Alloys.—Wholesale prices, f. o. b. works, are as follows:

Aluminum.	Per lb.	Aluminum.	Per lb.
No. 1, 99% ingots	33@37c.	Ferro-Tungsten (37%)	28c.
No. 2, 90% ingots	31@34c.	Magnesium	$2.75
Rolled sheets	4c. up	Manganese (over 90%)	1.00
Alum-bronze	20@23c.	Mangan'e Cop. (20% Mn)	32c.
Nickel-alum	33@39c.	Mangan'e Cop. (30% Mn)	38c.
Bismuth	$1.50	Molybdenum (Best)	$1.82
Chromium (over 90%)	1.00	Phosphorus	50c.
Copper, red oxide	50c.	American	70c.
Ferro-Molyb'um (50%)	$1.25	Sodium metal	50c.
Ferro-Titanium (10%)	90c.	Tungsten (Best)	62c.
Ferro-Titanium (20%)	$1.10		

Variations in prices depend chiefly on the size of the order.

Average Prices of Metals per lb., New York

	Tin. 1902.	Tin. 1901.	Lead. 1902.	Lead. 1901.	Spelter. 1902.	Spelter. 1901.
January	23.54	26.51	4.000	4.350	4.27	4.13
February	24.07	26.68	4.075	4.350	4.15	4.01
March	....	26.03	....	4.350	....	3.91
April	....	25.93	....	4.350	....	3.88
May	....	27.12	....	4.350	....	4.04
June	....	28.60	....	4.350	....	3.99
July	....	27.85	....	4.350	....	3.95
August	....	26.78	....	4.350	....	3.99
September	....	25.31	....	4.350	....	4.08
October	....	26.62	....	4.350	....	4.23
November	....	26.67	....	4.350	....	4.25
December	....	24.36	....	4.153	....	4.31
Year	....	26.54	....	4.334	....	4.08

Average Prices of Copper.

Month.	New York—Electrolytic. 1902.	New York—Electrolytic. 1901.	New York—Lake. 1902.	New York—Lake. 1901.	London—Standard. 1902.	London—Standard. 1901.
January	11.053	16.25	11.322	16.77	48.43	71.78
February	12,173	16.38	12,378	16.90	55.16	71.17
March	....	16.42	....	16.94	....	69.54
April	....	16.43	....	16.94	....	69.61
May	....	16.41	....	16.94	....	69.66
June	....	16.38	....	16.90	....	68.83
July	....	16.31	....	16.61	....	67.66
August	....	16.25	....	16.50	....	66.34
September	....	16.25	....	16.54	....	65.97
October	....	16.25	....	16.60	....	64.11
November	....	16.224	....	16.33	....	64.51
December	....	13.845	....	14.36	....	52.34
Year	....	16.117	....	16.53	....	66.79

New York prices are in cents, per pound; London prices in pounds sterling, per long ton of 2,240 lbs., standard copper. The prices for electrolytic copper are for cakes, ingots or wire bars; prices of cathodes are usually 0.25 cent lower.

Average Prices of Silver, per ounce Troy.

Month.	1902. London. Pence.	1902. N. Y. Cents.	1901. London. Pence.	1901. N. Y. Cents.	1900. London. Pence.	1900. N. Y. Cents.
January	25.62	55.56	28.97	62.82	27.30	59.30
February	25.41	55.09	28.13	61.06	27.40	59.76
March	....	....	27.04	60.63	27.59	59.81
April	....	....	27.30	59.29	27.41	59.59
May	....	....	27.43	59.64	27.56	59.96
June	....	....	27.42	59.57	27.81	60.42
July	....	....	26.96	58.46	28.23	61.25
August	....	....	26.94	58.37	28.13	61.14
September	....	....	26.95	58.26	28.85	62.63
October	....	....	26.62	57.59	29.58	63.83
November	....	....	26.12	56.64	29.66	64.04
December	....	....	25.46	55.10	29.68	64.14
Year	....	....	27.11	58.95	28.27	62.33

The New York prices are per fine ounce; the London quotation is per standard ounce, .925 fine.

LATE NEWS.

The annual meeting of the Canadian Mining Institute opened in Montreal on March 5. Whether because of an excellent series of papers presented for discussion or because of an increasing interest in the work of the Institute, there was a very large attendance, including the usual proportion of ladies. Numerous visitors from the States were present and received a cordial welcome. Everything indicated an unusually successful meeting.

The opening session on Wednesday was given to a discussion of the best manner in which the government could promote the development of the mineral resources of the Dominion. Resolutions were debated favoring the establishment by the government of a department of mines. This discussion lead to an attack on the methods of the Canadian Geological Survey and its general scheme of work.

The critics of the survey apparently desired that its scope should be broadened and that the government should take a more direct interest in the development of mineral resources. The survey's friends pointed out the excellent work it had done and was still doing.

In the evening, Mr. R. G. McConnell, of the Canadian Geological Survey, read a paper on "The Origin and Distribution of Yukon Gold."

STOCK QUOTATIONS.

NEW YORK.

Company and Location.	par val	Feb. 27. H.	Feb. 27. L.	Feb. 28. H.	Feb. 28. L.	Mar. 1. H.	Mar. 1. L.	Mar. 3. H.	Mar. 3. L.	Mar. 4. H.	Mar. 4. L.	Mar. 5. H.	Mar. 5. L.	Sales
Alice, Mont.	25					.49						.48		300
Amalgamated c., Mont	100	72.13	70.75	71.63	70.13	70.13	69.63	70 50	69.63	70.13	68.50	68.75	67.75	146300
Anaconda c., Mont.	25	33.50	33.13	33.38	33.00	32.50		33.00	32.50	32.50	32.00	32.25	32.00	5,300
Argentum-Jun., Colo.	2													
Belcher, Nev.	3							.10						200
Best & Belcher, Nev.	3	.30		.24						.20				700
Chrysolite, Colo.	50					.05						.04		700
Comstock T., Nev.	2½	.06		.06				.06				.06		8,000
Comstock Bonds, Nev.	100													
Con. Cal. & Va., Nev.	2½	1.55				1.40		1.40		1.35		1.35		650
Creede & C. C., Colo.	1							.08½						1,000
CrippleCr. Con., Colo.	1											.09	.08	1,000
Crown Point, Nev.	2	.10				.09	.08							500
Deadwood, S. Dak.	100	.65												20
Elkton, Colo.	1									1.25				200
Golden Fleece, Colo.	1	.45												300
Greene Con., Mex.	10	21.75	21 13							25.00	24.63	25.00	24.50	22,000
Hale & Norcross, Nev.	3			.32				.33				.32		1.350
Homestake, S. Dak.	100													
Isabella, Colo.	1			.25				.26	.25	.26				1,000
Jack Pot, Colo.	1	.33												200
Justice, Nev.	1					.07		.10						1,000
King & Pemb., Ont.	10													
Little Chief, Colo.	1	.13						.13				.12		1,800
Mexican, Nev.	3					.35								300
Moon-Anchor, Colo.	5			.21						.22	.21			2,500
Ontario, Utah	100			8.50				8.50						100
Ophir, Nev.	3			1.05	1.00			1.05		1.00		.95		700
Pharmacist, Colo.	1	.05												1,000
Phoenix, Ariz.	1	.07												300
Portland, Colo.	1									2.05				100
Quicksilver, Cal.	100					3.00		4.00				3.75		400
Quicksilver pf., Cal.	100			9.25				10.38	9.75	10.50	10.25	10.00		650
Small Hopes, Colo.	20	.40				.45								800
Standard Con., Cal.	10													
Tenn. C., Tenn.	25	15.50	15.25	15.00	14.75	15.00	14.75	15.00	14.75	14.88	14.50	14.75	14.00	700
Union Copper, N. C.	10	4.00	3.88	4.00	3.88	4.00	3.75	4.00	3.88	4.00	3.75	3.88	3.50	1,500
White Knob, Ida.	100	21.75	21.13	24.00	23.50	23.00	22.50	23.25	22.50	23.50	23.00	23.50	23.00	500
Work, Colo.	1							.02½		.07				1,500

Coal and Industrial Stocks.

Am. Agr. Chem., U.S.	100	24½	21	23	....	24½	22½	24½	23	23	22½	23	21	183
Am. Agr. Chem. pf, U.S.	100	86	81	85¼	84	89	84½	89	84½	89	84½	89	84½	200
Am. Car & Fdy., U.S.	100	28¼	28½	29⅛	28⅜	29	28¼	29	28⅞	29⅛	29⅛	30¼	29⅝	16,045
Am. Car & Fdy. pf, U.S.	100	88½	88¼	88⅞	88	88¼	....	88½	....	88½	....	88¼	88⅜	2,711
Am. Sm. & Ref., U.S.	100	48	47	47¼	47	47¼	49	47⅜	....	47⅛	46½	46⅜	46⅝	4,000
Am. Sm. & Ref. pf, U.S.	100	99	....	98⅞	....	99⅛	99	99½	....	98⅝	....	98½	98⅜	2,085
Col. Fuel & I., Colo.	100	86⅜	86½	86½	86	88	86½	88⅜	87½	88	86½	88¼	86½	13,450
Col. & H. C. & I., Colo.	100	17	....	....	....	....	....	17⅛	16½	17⅛	....	....	....	100
Int'l S. Pump, U.S.	100	52¾	....	53	....	53¼	53	53	....	52¾	....	53¼	52¾	800
Int'l S. Pump pf, U.S.	100	91	89	91	89	91	89	91	89	91	89½	91	89½	
Mong. R. Coal, Pa.	100	13⅝	13½	13⅜	13⅝	....	....	13⅜	13¼	13¼	....	13⅜	13⅝	3,010
Mong. R. Coal pf, Pa.	100	43	....	44	....	....	....	43¼	....	42⅝	42	42⅛	42¼	1,934
National Lead, U.S.	100	17⅝	....	17¼	17⅛	17¼	17	17¾	17	17½	....	17	....	1,000
National Lead pf, U.S.	100	85	83	84¼	81	83½	81	83¼	80	83¼	80	....	....	
National Salt, U.S.	100	23	....	25	....	25	....	25	....	23	....	23	....	
National Salt pf, U.S.	100	67	63	67	63	67	63	67	63	67	60	67	63	
Pittsburg Coal, Pa.	100	25⅛	....	25¼	....	....	....	25	....	25⅛	25	25	....	1,160
Pittsburg Coal pf, Pa.	100	90	....	90¼	90	90¼	90	90½	90	90⅜	90¼	90⅜	90¼	3,187
*Pressed Steel Car, Pa.	100	33½	33	33⅝	....	39⅝	39½	40¼	40	40	39½	39⅜	39	1,050
Republic I. & S., U.S.	100	16⅞	16½	16⅝	16⅜	16⅜	16¼	16⅝	16½	16⅝	16½	16½	16⅜	6,500
Republic I. & S., pf, U.S.	100	71⅝	70½	71½	71	71⅜	....	71⅝	71½	71⅜	71⅛	71⅜	71½	6,850
Sloss-Shef S. & I., Ala.	100	32	....	33	32½	33	32¼	33½	33	33⅓	33⅓	34	32	1,100
Sloss-Shef S. & I. pf, Ala.	100	....	....	83½	82¼	....	....	83½	....	83¼	....	84½	83½	400
Standard Oil, U.S.	100	640	635	640	635	645	640	650	648	650	649	650	649	
Tenn. C. I. & R. R., Ala.	100	69¼	68	69¼	67¾	69	68	70⅜	69	69¾	68	68⅝	68	48,275
U. S. Red. & Ref., Colo.	100	41⅞	41	42	41¼	42	41⅝	42⅜	41½	44⅛	42½	44	43⅜	5,400
U.S. Red. & Ref. pf, Colo	100	85⅞	85½	85¾	85½	86	85½	86	85½	86	....	85⅞	85½	2,330
U.S. Steel Corp., U.S.	100	†43⅜	43¼	43⅞	43⅛	43⅛	43⅛	43⅛	43⅛	43⅜	43	43	42⅜	69,005
U.S. Steel Corp. pf, U.S.	100	95	94⅝	95¼	94⅜	95	94⅜	95⅜	94⅜	95⅞	....	94⅞	94½	97,164
Va.-Car Chem., U.S.	100	62⅞	62½	62⅞	62½	63	62½	62⅞	62¾	62½	62¼	62¾	62⅜	3,900
Va.-Car Chem. pf, U.S.	100	123	121	123	121	123	121	123	121	123	121	123	121	....

Total sales 495,400 shares. * Ex-dividend.

PHILADELPHIA, PA. §

Name and Location of Company.	par val	Feb. 27. H.	Feb. 27. L.	Feb. 28. H.	Feb. 28. L.	Mar. 1. H.	Mar. 1. L.	Mar. 3. H.	Mar. 3. L.	Mar. 4. H.	Mar. 4. L.	Mar. 5. H.	Mar. 5. L.	Sales
Am. Alkali	$50	.43	....	38	....	....	....	....	....	....	....	....	....	860
Am. Cement	10	....	....	....	....	....	....	....	....	....	....	....	....	....
Beth. Iron, Pa.	50	....	....	....	....	....	....	....	....	....	....	....	....	....
Beth. Steel, Pa.	50	....	....	....	....	....	....	....	....	....	....	....	....	....
Cambria Iron, Pa.	50	48.00	....	4 775	....	48.80	47.75	48.00	47.88	48.00	....	....	....	....
Cambria Steel, Pa.	50	24.00	23.75	23.75	....	....	....	23.75	23.63	23.75	23.50	23.75	23.25	1,
Susq. S. & S., Pa.	10	....	....	....	....	....	....	2.03	....	....	....	2.00	....	16,
United Gas I., Pa.	50	121½	120	120⅜	119½	....	....	120⅝	120½	121	120⅜	120	....	2,21⅝

§Reported by Townsend, Whelen & Co., 309 Walnut St., Philadelphia, Pa. Total sales 5,237 shares.

MEXICO. Feb. 22.

Name of Company.	Shares.	Last div'd	Prices. Bid.	Prices. Ask.
Durango:				
Ca. Min. de Penoles	2,500	$50.00	$4,150	$4,250
Augustias, Pozos	2,400	5.00	70	75
Guananjuato:				
Cinco Senores y An., aviada	2,000	15.00	236	240
Cinco Senores y An., aviada	400	10.00	195	205
Providencia, San Juan de la Luz	6,000	2.00	190	205
Guerrero:				
Gardunoy Anexas.	7,200	....	30	50
Hidalgo:				
Amistad y Concordia.	9,600	4.71	53½	54
Carmen, aviada	1,100	....	250	300
Ca. Real del Monte	2,554	....	450	550
El Encino, aviador	1,120	....	40	50
Guadalupe Fresnillo y Annexas.	1,000	....	220	300
La Blanca, aviada	1,536	....	430	450
La Blanco, aviada	768	....	220	230
Maravillas y An., aviador	1,680	....	270	310
Maravillas el Lobo	1,000	....	300	325
Palma y An., aviador	1,800	....	15	25
Sta. Gertrudis y An., aviador	9,600	....	7	9
Sta. Gertrudis y An., aviador	28,800	0.50	60½	61½
Santo Tomas Apostol aviador	5,100	....	9	....
San Rafael y An., aviada	1,200	12.00	680	680
San Rafael y An., aviada	1,200	8.00	330	370
Sobodad, aviada	960	5.00	270	280
Sorpressa, aviada	900	5.00	205	220
Mexico:				
Alacran	2,400	....	$70	$90
La Esperanza (El Oro)	3,000	$10.00	850	870
Socovon de S. Fern.	2,500	....	20	30
Michoacan:				
Luz de Borda, aviador	3,000	....	20	25
Luz de Borda, aviada	1,000	....	20	25
San Luis Potosi:				
Concepcion y An.	3,000	....	130	135
El Barreno, aviador	2,000	2.00	20	25
Sta. Maria de la Pa.	2,400	15.00	515	525
Santa Fe.	2,400	....	20	30
San Diego y Annexas.	2,400	4.00	83	85
Zacatecas:				
Candelaria y Pinos	2,500	....	350	400
San Carlos y Annexas	2,500	10.00	305	310
Sta. Maria de Gaud.	2,500	10.00	345	350
Miscellaneous:				
Bartolome de Medina	2,000	2.00	50	55
Guadalupe Hacienda	10,000	3.00	215	220
La Luz Hac. (Pachuca)	3,750	....	60	70
La Reina (Chihuahua)	192	....	2,500	3,500
Naica (Chihuahua)	100	....	4,000	5,000
Natividad (Oaxaca) aviador	1,800	4.00	500	500
National (Oaxaca) aviador	1,800	4.00	400	500
San Francisco Hac.	6,000	2.00	175	180
Santa Ana Huantla Morelos	4,000	....	50	70
Union Hacienda	3,000	5.00	200	220

BOSTON, MASS.

Name of Company.	par val	Shares listed.	Feb. 27. H.	Feb. 27. L.	Feb. 28. H.	Feb. 28. L.	Mar. 1. H.	Mar. 1. L.	Mar. 3 H.	Mar. 3 L.	Mar. 4. H.	Mar. 4. L.	Mar. 5. H.	Mar. 5. L.	Sales.
Adventure Con., c	$25	100,000	22.50	22.25	22.00	....	22.75	....	23.50	23.00	23.50	23.00	22.00	21.50	1,994
Allouez, c.	25	80,000	4.00	3.88	....	....	4.00	....	4.75	4.13	4.25	4.00	4.00	....	2,255
Amalgamated, c	100	1,500,000	72.00	70.75	71.63	70.00	79.00	69.63	70.50	69.75	70.00	68.63	69.00	67.75	12,062
Am. Gold Dreg.	5	90,000	....	....	2.00	1.75	....	....	....	....	3.75	3.00	2.88	2.00	15,365
Am. Z. L. & Sm.	25	60,000	....	....	....	....	9.00	....	....	....	....	....	9.50	9.00	100
Anaconda, c.	25	1,200,000	34.00	....	7 75	4.88	7.00	6.50	8.00	6.75	9.00	7.50	7.75	6.75	12,894
Arcadian, c.	25	150,000	5.00	....	....	....	....	....	....	....	33.00	....	32.75	....	
Arnold, c.	25	60,000	....	....	....	....	....	....	1.00	....	....	....	....	....	
Atlantic, c.	25	40,000	31.00	30.00	....	....	....	....	31.00	30.00	31.00	30.00	30.00	27.63	548
Baltic.	25	100,000	48 00	47.00	48.75	47.38	....	....	47.00	....	45.75	....	....	....	1,049
Bingham, Cons.	50	150,000	23.50	....	....	....	23.50	....	24.75	23.75	24.75	24.00	24.00	23.50	1,880
Bonanza Dev.	10	300,000	....	....	....	....	.85	....	....	....	.90	....	.90	.85	1,900
Boston, q.	10	100,000	....	....	....	....	....	....	....	....	....	....	....	....	
British Columbia.	5	250,000	....	....	....	....	....	9.00	....	10.00	10.38	9.00	9.50	....	2,925
Cal. & Hecla, c.	25	100,000	610.	....	600.	....	....	....	605.	595.	6.00	....	600	....	91
Catalpa	10	300,000	....	....	....	....	....	....	....	....	....	....	....	....	
Centennial, c.	25	90,000	18.13	17.50	18.25	17.25	17.25	17.00	17.75	17.13	17.75	16.50	17.25	15.75	11,121
Central Oil	25	60,050	....	....	....	....	7.50	....	....	....	....	....	....	....	50
Cochiti, g.	10	182,250	.49	....	.50	.49	....	....	....	....	.50	....	.50	.49	1,344
Cons. Mercur, g.	5	1,000,000	2.00	.188	2.00	1.93	2.00	1.93	1.93	....	2.00	1.93	2.00	1.93	5,915
Con. Zinc & L. M. S.	10	110,000	....	....	2.50	....	....	....	....	....	....	....	....	....	100
Copper Range Con.	100	285,000	47.25	47.25	48.75	46.38	47.00	46.00	47.50	46.75	....	....	....	....	5,824
Copper Range,	25	100,000	72.00	71.50	72.25	72.13	73.00	....	70.25	....	47.75	45.50	70.00	....	4,567
Daly-West.	20	150,000	22.50	21.50	21.50	20.50	20.00	....	20.50	20.00	....	....	21.00	20.00	1,546
Dominion Coal	100	150,000	86.50	83.50	88.13	86.50	89.50	87.00	99.00	89.00	104¾	98.50	103¾	98.00	28,124
Dominion Coal, pf.	100	30,000	117.	....	....	....	117.	....	....	....	117.	....	....	....	120
Elm River, c.	12	100,000	2.75	2.50	4.00	2.63	5.50	4.00	5.00	4.50	4.88	3.75	3.88	3.50	14,875
Franklin, c.	25	100,000	15.00	14.50	....	....	....	....	1.463	14.50	....	....	14.50	....	286
Guanajuato Cons.	5	385,000	4.38	4.00	4.25	....	4.25	4.00	4.50	4.13	4.38	4.00	4.13	3.88	3,300
Humboldt, c.	25	40,000	....	....	....	....	....	....	....	....	....	....	....	....	
I. Royale Con., c.	25	150,000	21.50	....	22.00	21.00	....	....	21.00	....	21.00	....	21.00	....	645
Mass. Con., c.	25	100,000	18.50	18.00	19.25	18.25	19.00	18.75	20.50	18.75	21.00	18.75	19.00	18.00	12,062
Mayflower, c.	25	100,000	2.25	2.13	3.00	2.50	2.75	2.63	3.00	2.75	3.38	3.00	....	....	4,180
Merced.	15	100,000	....	....	....	....	....	....	....	....	....	....	....	....	
Michigan, c.	25	100,000	11.75	11.50	11.50	....	12.00	11.50	12.00	11.50	11.75	11.25	11.50	11.00	1,248
Mohawk, c.	25	100,000	38.75	38.25	39.00	37.50	38.00	37.50	38.00	37.00	37.75	36.50	36.00	35.00	5,569
Mont. C. & C.	25	200,000	....	....	....	....	2.75	2.47	4.00	3.25	4.00	3.00	3.88	3.50	2,010
Mont'l & Boston	5	570,000	3.75	3.00	3.75	3.06	3.63	3.06	3.63	3.75	3.75	3.63	4.00	3.63	28,780
National.	25	100,000	....	....	1.50	....	1.25	....	1.75	....	....	....	....	....	7 00
N. E. Gas & Coke.	100	100,000	....	....	5.50	5.25	5.50	....	....	....	5.25	5.00	5.25	....	480
Old Colony, c.	25	100,000	....	....	4.00	3.50	....	....	3.75	3.50	4.25	3.88	....	....	2,055
Old Dominion, c.	25	150,000	23.00	22.25	....	....	....	....	....	....	23.00	22.50	22.50	....	700
Osceola, c.	25	96,150	77.50	76.00	76.50	75.00	75.25	....	75.75	75.00	75.50	73.00	73.50	71.50	2,740
Parrot, s. c.	10	229,850	....	....	32.00	....	2.900	....	32.50	32.00	32.60	31.50	32.50	31.25	602
Phoenix Con., c.	25	100,000	3.75	3.50	....	....	....	....	3.50	....	4 00	....	....	....	443
Quincy, c.	25	100,000	1.40	....	140¼	1.40	....	....	1.41	....	1.39	....	135.	....	160
Rhode Island, c.	25	100,000	2.50	....	2.50	....	....	....	3.25	2.88	3.25	3.00	3.00	....	2,220
Santa Fe, g. c.	10	250,000	3.50	....	3.50	....	3.75	....	3.88	....	4.00	3.50	3.75	3.50	415
Santa Ysabel	5	130,000	.50	....	....	....	....	....	....	....	....	....	.50	....	320
Shawmut Oil	25	50,000	....	....	....	....	....	....	....	....	....	....	....	....	
Tamarack, c.	25	60,000	234.	230.	230.	....	2.30	....	230.	230.	225.	220.	220.	2.07	571
Tecumseh, c.	25	80,000	11.50	11.00	....	....	....	....	2.00	....	....	....	....	....	100
Tennessee	25	175,000	....	....	....	....	....	....	....	....	....	....	13.63	13.50	250
Trimountain, c.	25	100,000	105.	....	110.	105.	105.	....	105.	....	105.	103.	104.	100.	3,539
Trinity, c.	25	160,000	12.75	12.50	13.75	12.75	15.75	13.25	18.50	16.50	18.50	16.50	16.00	14 50	43,156
United States, g.	25	250,000	18.00	17.75	18.00	17.50	17.88	17.75	17.75	17.63	17.88	17.50	17 75	17.50	2,518
U. S. Oil.	25	100,000	12.25	12.00	12.25	12.00	....	....	12.00	....	....	....	12.00	....	190
Utah Con., g.	5	300,000	24.75	....	24.25	....	....	....	25.00	23.50	24.50	23.00	24.00	22.88	1,417
Victoria, g.	25	100,000	6.00	5.63	5.75	....	6 00	5.88	6.63	6.00	6.50	5.25	5.88	5.50	5,570
Washington, c.	25	60,000	....	....	....	....	....	....	....	....	....	....	....	....	
Winona, c.	25	100,000	....	....	4.50	....	1.75	1.50	2.00	1.75	2.00	....	....	....	910
Wolverine, c.	25	60,000	52.00	....	52.50	52.00	52.50	....	52.75	....	53.50	52.88	53.00	....	775
Wyandot, c.	25	100,000	.75	....	....	....	1.00	....	1.25	1.00	1.50	1.00	....	....	1,385

Official Quotations, Boston Stock Exchange. Total sales, 263,786 shares. †Ex-dividend. §Ex-asst. paid.

ST. LOUIS, MO.* Feb. 24.

Name.	Shares.	Par	Bid.	Ask.	Name.	Shares.	Par	Bid.	Ask.
Am.-Nettie, Colo.	300,000	$10	$1.00	$1.05	Doe Run Lead Co.	10,000	$100	$128.00	$135.00
Catherine Lead, Mo.	50,000	10	3.00	4.00	Granite Bimet, Mt.	1,000,000	10	2.65	2.70
Central Lead, Mo.	10,000	100	130.00	135.00	K. & Tex. Coal, Mo.	25,000	100	51.50	53.00
Columbia Lead, Mo.	50,000	10	11.50	12.00	Renault Lead, Mo.	30,000	10	9.00	10.00
Con. Coal, Ill.	50,000	100	19.25	21.00	St. Joe Lead, Mo.	300,000	10	16.00	18.00

*From our Special Correspondent.

SPOKANE, WASH.* Feb. 28.

Name of Company.	Par Val.	H.	L.	Sales.	Name of Company.	Par Val.	H.	L.	Sales.
Black Tail	$1	.13½	.13¼	....	Quilp	$1	.37	....	....
Den Hur	1	.16	.15¾	....	Rambler Cariboo	1	.90	.87½	....
Gold Ledge	0.05	.02½	.02	7,500	Republic	1	.10¼	.10⅛	1,000
Lone Pine-Surp. Con.	1	.07¾	.07½	4,000	San Poil	1	.32	.31	1,000
Morning Glory	1	.03½	.03¼	....	Sullivan	1	.10½	.09¾	5,700
Mountain Lion	0.10	.33⅛	.33	....	Tom Thumb	1	.23⅜	.23½	3,000
Princess Maud	1	04	.03½	11,000	Trade Dollar	1	.12	.11	500

Total sales 33,700 shares. * Reported by Hunner & Harris.

SALT LAKE CITY.* Mar. 1.

Name of Company.	Location.	Shares.	Par Val.	Quotations. High.	Quotations. Low.	Sales.
Ajax	Tintic	300,000	$10	$0.23½	$0.21	28,500
Anchor	Park City	150,000	10	....	....	....
Bullion Beck	Tintic	100,000	10	....	....	....
Carisa	Tintic	500,000	1	.35	.31	37,450
Con. Mercur	Mercur	1,000,000	5	2.03½	1.91¼	12,025
Creole	Park City	150,000	1	....	....	....
Daly	Park City	150,000	20	....	....	....
Daly-West	Park City	150,000	20	22.60	19.20	9,075
Dexter	Tuscarora	200,000	5	....	....	....
Eagle & B. Bell	Tintic	250,000	1	.70	.70	200
Grand Central	Tintic	250,000	1	2.00	2.00	300
Horn Silver	Frisco	400,000	25	....	....	....
L. Mammoth	Tintic	150,000	1	.73	.62	9,600
Mammoth	Tintic	400,000	25	....	....	....
May Day	Tintic	400,000	.25	.58	.54	37,400
Ontario	Park City	150,000	100	....	....	....
Sacramento	Mercur	1,000,000	5	.18	.18	1,500
Silver King	Park City	150,000	20	80.00	79.00	....
Star Con.	Tintic	500,000	1	.20	.15¾	22,700
Swansea	Tintic	100,000	5	....	....	....
So. Swansea	Tintic	300,000	1	....	....	....
Showers Con.	Tintic	400,000	5	....	....	....
Sunshine	Mercur	250,000	10	....	....	....
Tetro	Tintic	500,000	5	.10	.06	4,800
Tesora	Tintic	400,000	1	....	....	....
U. Sunbeam	Tintic	150,000	1	.36	.29	4,900
Uncle Sam	Tintic	500,000	1	.48	.44	19,400
West Mng. Glory	Tintic	500,000	.10	.03½	.03	80,500
Victor	Tintic	500,000	1	.30	.17	18,000
Yankee Con.	Tintic	500,000	1	2.10	1.95	4,800
Ben Butler	Bingham	500,000	1	.07¾	.06½	33,100
Boss Tweed	Tintic	250,000	1	.70	.48	10,000
California	Park City	300,000	1	.26	.15	108,600
Century	Park Valley	150,000	1	.25	.24	1,700

*By our Special Correspondent. Total number of shares sold, 445,750

STOCK QUOTATIONS.

COLORADO SPRINGS, COLO.

Name of Company.	par val	Feb. 24. H.	Feb. 24. L.	Feb. 25. H.	Feb. 25. L.	Feb. 26. H.	Feb. 26. L.	Feb. 27. H.	Feb. 27. L.	Feb. 28. H.	Feb. 28. L.	Mar. 1. H.	Mar. 1. L.	Sales
Acacia	$1	.10¼	.....	.10¾	.10¼	.10⅜	.10	.10⅛	.10¼	.10⅛	.10¼	.10⅜	.10¼	3,600
Alamo	1	.03¼	.....	.03⅜	.03⅜	.03¾	.03⅜	.03¾	.03⅝	.03⅜	.03⅜	.03⅜	.03⅜	45,000
Am. Con	1	.02⅜	.02⅜	.02¾	.02¼	.02¼	.02⅜	.02⅜	.02¼	.03	.02	.03	.02	5,000
Anaconda	1	.25	.21	.25	.22⅜	.25	.22	.20	.....	.21⅜	.21⅝	.25	.20	4,100
Anchor	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Antelope	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Aola	1	.01⅞	.....	.01⅞	.01	.01⅞	1	.01⅜	.01	.01⅜	.01⅜	.01⅜	.01⅛	28,000
Argentum Jr	1	.05¼	.05½	.05	.04¼	.05	.04	.04½	.04¼	.04¾	.03	.04	.03⅜	19,000
Banner	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Battle Mt. C	1	.14	.13	.14	.12½	.14	.12½	.14	.....	.14	.....	.14	.....	.....
Ben Hur	1	.04½	.03½	.....	.....	.04	.01⅝	.05	.....	.04	.....	.05	.....	.....
Black Bell	1	.....	.....	.07	.04	.07	.....	.07¾	.....	.....	.....	.09	.....	.....
Blue Bell	1	.08¾	.....	.....	.....	.08½	.....	.08¾	.....	.09	.....	.09	.....	.....
Buckhorn	1	.02	.01½	.02	.01⅜	.02	.01½	.01¼	.....	.02⅜	.01½	.02	.01⅛	.....
But'fly Ter	1	.....	.....	.17	.14	.17	.14	.14	.....	.16	.14	.16	.14	2,250
Cadillac	1	.01¼	.....	.01⅛	.....	.01⅛	.....	.....	.....	.01⅛	.....	.01½	.....	2,000
Cent'l Con	1	.06	.....	.....	.....	.06	.....	.....	.....	.06½	.06	.05¼	.....	8,000
Champion	1	.04½	.....	.03½	.....	.03½	.02½	.03½	.02¼	.....	.....	.02½	.....	.....
C. K. & N	1	.03⅞	.03½	.03½	.03⅜	.03¼	.03½	.03½	.03⅜	.04	.03⅞	.04¼	.04	76,00
Columbine-Victor	1	.06⅜	.02⅜	.06½	.05¼	.06⅜	.05¼	.06⅜	.05¼	.05½	.05¼	.06⅜	.05¼	1,500
C. C. G. Ext	1	.04⅞	.04¼	.06	.04⅝	.06⅜	.05	.05¼	.05	.05½	.05¼	.05¾	.05⅜	8,000
C. C. & Mn	1	.02⅜	.02¼	.02½	.02⅜	.02⅜	.02¼	.02⅜	.02¼	.02½	.02¼	.02⅜	.....	7,000
Cr'de & C. C	1	.08	.04	.04	.....	.04	.....	.04	.....	.03	.....	.04	.....	.....
C. C. Con	1	.08¼	.08	.08⅜	.08¼	.08	.07⅞	.08	.07¼	.08⅛	.07½	.05½	.....	8,000
Dante	1	.....	.....	.04	.03¾	.04	.03¾	.03¾	.03⅝	.03¾	.03⅜	.03⅞	.03¾	2,000
Dr. Jack Pot	1	.45½	.44½	.50	.49½	.50	.48	.47	.45	.46½	.46	.49¼	.48¾	19,350
Echo	1	.01⅝	.01⅜	.01½	.01⅜	.01⅝	.01⅜	.01⅝	.01⅜	.01⅝	.01⅜	.01⅝	.01½	27,00
Elkton, Con	1	1.26¾	1.26½	1.28	1.27½	1.27½	1.27¼	1.28	1.27	1.27	1.26¾	1.28	1.27	26,388
El Paso, G	1	.50½	.58	.57	.56⅞	.57	.55	.55	.54¼	.54½	.53¾	.53½	.53	30,900
Fanny Rawlings	1	.....	.....	.....	.....	.....	.....	.12	.....	.07	.....	.....	.....	.....
Findley	1	.09⅝	.....	.09½	.09	.09¾	.09⅜	.09¾	.09⅜	.09¾	.09⅜	.09⅞	.09½	11,500
Gold Dollar	1	.07	.04½	.05¼	.05⅝	.06	.05½	.05¾	.05⅛	.....	.....	.05¾	.05¼	2,500
Gold Dollar Con	1	.17	.14¾	.17½	.15	.17	.16	.17½	.15½	.15	.....	.17¾	.16	3,250
Gold Cycle	1	.70	.69	.68	.....	.68¾	.....	.69¼	.69	.70	.68	.70	.68½	19,000
Gold Fleece	1	.50	.35	.45	.35	.45	.35	.50	.35	.45	.35	.50	.35	1,200
Gold Knob	⅛	.02¾	.02¼	.03	.02	.02⅞	.02¼	.02⅝	.02⅛	.03	.02⅛	.03	.02⅝	6,000
Gold Sov'n	1	.03¼	.03	.03¼	.03	.03	.02⅝	.03	.02¼	.03	.....	.03	.....	1,000
Ida May	1	.....	.....	.16	.....	.16	.....	.....	.....	.....	.....	.15	.....	1,000
Ironclad	1	.04½	.....	.04½	.....	.....	.....	.....	.....	.04½	.....	.....	.....	.....
Isabella	1	.22½	.22	.23	.22⅜	.22½	.21⅜	.22¾	.22⅛	.23	.22⅜	.23½	.23¼	21,300
Jack Pot	1	.32	.30	.33	.31	.33	.31	.32¼	.31	.32½	.32	.33	.32	4,800
Key West	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.01	.....	.....
Last Dollar	1	.55	.....	.50	.30	.55	.....	.50	.30	.55	.....	.55	.30	1,000
Lexington	1	.05⅜	.05⅛	.05½	.05¼	.05¼	.05⅜	.05¼	.05⅛	.05½	.05¼	.06⅜	.05¼	62,500
Matoa	1	.08	.....	.08	.....	.08	.....	.08	.....	.08	.....	.08	.....	2,500
Midway	1	.03½	.03	.03½	.03¼	.03½	.03¼	.....	.....	.03¼	.....	.03¼	.....	2,000
M. J. T	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Mobile	1	.02	.01½	.01½	.01¼	.01½	.01¼	.01¼	.01	.01¼	.01	.02	.01⅜	56,500
Moll Dwyer	1	.02	.....	.02	.....	.02	.01¼	.....	.....	.....	.....	.....	.....	.....
Mol. Gibson	1	.14	.13¼	.13½	.13½	.14	.13⅜	.13¾	.12½	.14	.....	.12½	.11¾	6,000
Monarch	1	.02¼	.02	.02⅛	.02	.02½	.01⅞	.02	.01¾	.02¼	.01⅝	.02¼	.01½	7,900
Montreal	1	.01½	.....	.01½	.....	.02	.....	.01½	.....	.01½	.....	.01½	.....	.....
Moon A'c'r	1	.20	.....	.19½	.....	.20	.....	.20	.....	.20	.....	.20	.....	.....
Morn'g Star	1	.03⅜	.03	.03⅜	.03	.03½	.03	.03¼	.03	.03½	.03⅜	.03½	.03¼	6,000
National	1	.02	.01⅝	.02	.01⅝	.02	.01½	.01¾	.01⅝	.01⅝	.01¾	.01 ⅝	.01⅜	8,000
Nellie, V	1	.02½	.02⅜	.02⅝	.02⅜	.02⅝	.02⅜	.02¾	.02¼	.02½	.02¼	.02⅝	.02⅜	13,000
New Haven	1	.03⅜	.02⅜	.03¼	.03	.03½	.03⅜	.03¾	.03⅜	.03⅝	.....	.04	.03⅝	14,000
Olive Branch	1	.01½	.....	.02¼	.....	.02¼	.01	.....	.....	.....	.....	.02⅛	.....	.....
Oriole	1	.01½	.01	.01¾	.....	.01⅝	.....	.01¾	.....	.01	.....	.01½	.....	.....
Pappoose	1	.02½	.....	.02½	.....	.02	.01½	.01½	.....	.....	.....	.....	.....	.....
Pharmacist	1	.03⅛	.03½	.03⅜	.....	.04	.03¼	.04	.03⅜	.03¼	.03½	.04	.03⅛	.....
Pinnacle	1	.07	.05	.07	.06	.07	.06	.05½	.....	.06½	.05½	.06¾	.05½	1,000
Pointer	1	.03¼	.03	.03¼	.03	.03¼	.03	.03⅜	.03	.03¾	.03⅜	.03¾	.03	5,000
Portland	1	2.55	2.50	2.50	2.40	2.60	2.45	2.60	2.50	2.60	2.50	2.60	2.55	3,000
Prince Alb	1	.02⅛	.02	.02½	.02¼	.02¼	.....	.02⅜	.02⅜	.03	.02⅜	.03	.02½	13,200
Princess	1	.02⅛	.02	.02¼	.02	.02	.01½	.....	.....	.....	.....	.02¼	.01⅜	6,000
Progress	1	.03⅛	.03¼	.03⅜	.03	.03	.02¾	.03	.02⅞	.03½	.03¼	.03½	.03	17,000
Pythias	1	.02¼	.....	.02¼	.....	.02¼	.....	.....	.....	.02	.02½	.02½	.01¾	.....
Republic	1	.02	.01¾	.02	.01¾	.02	.01¾	.01¾	.....	.02½	.01¼	.....	.....	.....
Rob. Burns	1	.01⅜	.....	.01⅜	.....	.01¼	.....	.02	.01	.....	.....	.....	.....	10,000
Rose Maud	1	.03	.02¾	.03½	.02¾	.03½	.03	.03½	.03	.03½	.02⅞	.03⅛	.02⅝	.....
Rose Nicol	1	.04	.03¼	.03⅜	.03½	.04	.03¼	.04⅜	.03⅜	.04⅜	.03⅛	.04⅛	.03¼	1,000
Sunset Eclipse	1	13¾	.13½	.13½	.13⅜	.13¼	.13¼	.13¼	.13	.13⅜	.12½	.01⅜	.....	22,000
Uncle Sam	1	.01½	.01	.01½	.01	.01⅜	.01⅛	.02	.01½	.....	.....	.02	.01	5,000
Vindicator	1	1.20	1.16	1.20	.....	1.20	.....	1.20	1.00	1.20	1.07	1.20	1.10	1,500
Va. M	1	.02½	.....	.03	.....	.03	.....	.02¾	.....	.02	.....	.....	.....	.....
Work	1	.06½	.03½	.07	.06⅝	.07	.06¾	.06¾	.06⅝	.06¾	.06¼	.06¾	.06⅜	52,500
Zenobia	1	.10½	.....	.10¼	.....	.....	.....	.....	.....	.....	.....	.10	.....	.....

Total sales 710,738 shares.

Colorado Springs (*By Telegraph.*)

Name of Company.	par val	Feb. 27. H.	Feb. 27. L.	Feb. 28. H.	Feb. 28. L.	Mar. 1. H.	Mar. 1. L.	Mar. 3. H.	Mar. 3. L.	Mar. 4. H.	Mar. 4. L.	Mar. 5. H.	Mar. 5. L.
Acacia	$1	.10½	.10¼	.10⅝	.10¼	.10¾	.10¼	.11	.10⅜	.10⅝	.10¼	.10¼	.10
Alamo	1	.01⅜	.01½	.03⅜	.03½	.03⅜	.03½	.03⅜	.03⅜	.03¾	.03⅜	.03⅜	.03¼
Anaconda	1	.23	.20	.24½	.21⅜	.25	.20	.23	.20	.23	.20	.22½	.20
Argentum	1	.04½	.04¼	.03¾	.03	.04	.03⅜	.04	.03¼	.04⅛	.03¾	.04	.03¼
Battle Mt.	1	.14	.12½	.14	.12½	.14	.12½	.14	.12½	.14	.12	.14	.12⅝
Butterfly Ter	1	.17	.10	.16	.14	.16	.14	.15	.14	.15	.14	.15	.14
Cripple Creek Con	1	.08	.07¼	.08½	.07½	.08½	.07⅜	.08⅛	.08¼	.08	.08¼	.08¾	.07⅜
Dr. Jack Pot	1	.48	.45	.46½	.46	.49¼	.48⅜	.49½	.49	.47⅜	.47½	.48	.47⅜
El Paso	1	.55	.54½	.54½	.53¼	.53½	.53	.52½	.51½	.55	.54	.52¾	.52¼
Elkton, Con	1	1.28	1.27	1.27	1.26½	1.28	1.27	1.27⅛	1.26½	1.28¼	1.28	1.28	1.27½
Fanny Rawlings	1	.08½	.....	.12	.07	.12	.07	.11	.07¼	.12	.07	.12	.07
Findlay	1	.09¼	.03½	.08¼	.09½	.08¾	.09½	.10	.09⅜	.10	.09⅜	.10½	.10
Gold Dollar Cons	1	.17½	.15½	.16	.15	.17¼	.16	.17¼	.16⅜	.17¼	.15⅝	.17¼	.16¾
Gold King	1	.55	.45	.55	.45	.55	.45	.55	.40	.55	.40	.55	.40
Golden Cycle	1	.69¼	.68	.70	.68½	.70	.68¾	.69½	.68	.70	.68	.70	.68
Golden Fleece	1	.50	.35	.45	.35	.50	.35	.50	.35	.44	.35	.40	.30
Hart	1	.05	.04	.05	.04	.05	.04	.05	.04	.05	.04	.05	.04
Isabella	1	.22¾	.22⅜	.23	.22⅜	.24¼	.23¼	.23⅜	.23	.23¾	.22½	.23½	.23
Jack Pot	1	.32¼	.31	.32½	.32	.33	.32	.35	.33	.34	.33	.34½	.34
Katinka	1	.....	.....	.....	.....	.....	.....	.....	.....	.40	.35	.45	.30
Keystone	1	.08	.05	.08	.05	.08	.05	.08	.05	.08⅛	.03½	.08⅛	.04½
Last Dollar	1	.50	.30	.55	.30	.55	.30	.55	.30	.50	.30	.55	.30
Lexington	1	.05⅜	.05⅛	.05½	.05¼	.05½	.05¼	.06	.05½	.06¼	.06	.07	.06¾
Mollie Gibson	1	.13¼	.12½	.14	.12½	.12½	.11¾	.13	.11	.11⅝	.11	.12	.10
Moon Anchor	1	.20	.18	.20	.18	.20	.18	.20	.18	.22	.20	.20½	.19
National	1	.01¾	.01½	.01⅝	.01⅜	.01⅝	.01⅜	.01⅝	.01¼	.01¾	.01¼	.01½	.01
New Haven	1	.03¾	.03½	.04	.03⅝	.04	.03⅝	.04	.03⅝	.04	.03	.04⅜	.03¾
Pharmacist	1	.04	.03⅜	.03¾	.03⅜	.04	.03½	.03⅝	.03⅜	.03⅝	.03⅜	.04	.03½
Pinnacle	1	.06½	.05	.06⅝	.05½	.06⅝	.05½	.07	.05½	.07	.05½	.06⅜	.05½
Portland	1	2.60	2.50	2.60	2.50	2.60	2.55	2.60	2.50	2.57	2.50	2.50¼	2.50
Vindicator, Con	1	1.20	1.00	1.20	1.07	1.20	1.10	1.15	1.13	1.15	1.10	1.15	1.10
Work	1	.06¾	.06⅜	.03¾	.06⅜	.06⅜	.06½	.06¾	.06⅜	.06¾	.06⅜	.03¾	.06⅝

MONTREAL, CANADA. Mar. 3.

Name of Company.	par val	H.	L.	Sales	Nome of Company.	par val	H.	L.	Sales
Big Three	$1	.01¼	.....	.....	Montreal-London	$0.24	.02¼	.....	.....
California	1	.04½	.04	.....	Noble Five	1	.....	.....	.....
Can. Gold Fields	0.10	.....	.....	.....	Novelty	1	.....	.....	.....
Deer Trail Con	1	.03½	.02¼	.....	North Star	.....	.24	.....	.....
Evening Star	1	.04	.02	.....	Payne	1	.32	.20	16,000
Golden Star	1	.04¼	.03	.....	Rambler-Cariboo	1	.....	.....	.....
Gold Hills Dev	1	.01½	.....	.....	Republic Con	1	.10	.....	.....
Knob Hill	1	.....	.....	.....	Slocan-Sovereign	1	.02¼	.....	.....
Monte Christo	1	.02	.....	.....	Virtue	1	.24	.23¼	500
Montreal, G. F	1	.02½	.....	.....	War Eagle	1	.....	.....	.....

LONDON. Feb. 22.

Name and Country of Company	Authorized Capital.	Par value.	Last dividend. Amt.	Last dividend. Date	Quotations. Buyers.	Quotations. Sellers.
	£	£. s. d.	s. d.		£. s. d.	£. s. d.
Alasks-Treadwell, g., Alaska	1,000,000	5 0 0	1 6	Jan., 1902	4 0 0	4 5 0
Anaconda, c. s., Montana	6,000,000	5 0 0	8 2	Oct., 1901	6 11 3	6 13 9
Copiapo, c., Chile	200,000	2 0 0	2 6	Dec., 1901	2 7 6	2 12 6
De Lamar, g. s., Idaho	400,000	1 0 0	2 0	Dec., 1901	1 17 6	1 2 6
El Oro, g., Mexico	1,000,000	1 0 0	1 3	July, 1901	1 6 3	1 8 9
Enterprise, g., British Col	200,000	1 0 0			.....	8 9
Frontino & Bolivia, g., Columbia	140,000	1 0 0	3 0	July, 1901	1 2 6	1 5 0
Hall, Mg. & Sm., c. s., British Col	325,000	1 0 0			7 0	8 0
Le Roi, g., British Col	1,000,000	5 0 0	5 0	Nov., 1899	3 17 6	4 0 0
Le Roi No. 2, g., British Col	120,000	5 0 0	5 0	July, 1901	3 8 9	3 11 3
Montana, g. s., Montana	680,000	1 0 0	6	April, 1899	4 6	5 0
Mountain Copper, California	1,250,000	5 0 0	5 0	Oct., 1901	3 15 0	4 0 0
Stratton's Independence, Colorado	1,100,000	1 0 0	1 0	Jan., 1902	8 9	11 3
St. John del Rev., g., Brazil	600,000	1 0 0	1 0	June, 1901	18 9	1 0 0
Utah Con., g., (High. Boy), Utah	300,000	1 0 0	5 0	May, 1901	4 10 0	5 0 0
Ymir, g., British Col	200,000	1 0 0	1 0	Mar., 1902	2 2 6	2 5 0
European:						
Linares, l., Spain	45,000	3 0 0	7 0	March, 1901	4 10 0	5 00 0
Mason & Barry, c., sul., Port'g'l	420,000	1 0 0	12 6	May, 1901	3 12 6	3 17 6
Rio Tinto, c., Spain	1,625,000	5 0 0	£1 15s	Nov., 1901	45 2 6	45 7 6
Rio Tinto, pref., Spain	1,625,000	5 0 0	2s 6d	Nov., 1901	6 0 0	6 5 0
Tharsis, c., Spain	1,250,000	2 0 0	12 0	May, 1900	6 15 0	7 0 0
Australia and New Zealand:						
Assoc. Gold Mines, W. Australia	500,000	1 0 0	1 6	Jan., 1900	1 8 9	1 10 0
Br'ken Hill Pr'p., s., N. S. Wales	384,000	8 0	1 0	Nov., 1901	1 15 0	1 17 6
Great Bo'd'r Pr'p., W. Australia	175,000	2 0	6	Jan., 1902	19 6	1 0 0
Hannan's Brownhill, g., W. Australia	140,000	1 0 0	7 6	Oct., 1900	2 12 6	2 13 9
Ivanhoe Gold C'p., W. Australia	1,000,000	5 0 0	3 0	Feb., 1902	7 13 9	7 16 3
Kalgurlie, g., W. Australia	120,000	1 0 0	rts.	Oct., 1899	3 11 3	3 13 9
Lake View Cons., g., W. Australia	250,000	1 0 0	5 0	Oct., 1901	4 0 0	4 1 3
Mt. Lyell M. E. R. I., c., Tasmania	900,000	3 0 0	4 0	Jan., 1902	4 0 0	4 2 6
Mt. Morgan, g., Queensland	1,000,000	1 0 0	3	Feb., 1902	4 2 6	4 7 6
Waihi, g., New Zealand	330,000	1 0 0	2 6	Mar., 1902	5 13 9	5 16 3
Indian:						
Champion Reef, g., Colar Fields	234,169	10 0	7 8	Jan., 1902	5 16 3	5 18 9
Mysore Gold, Colar Fields	265,000	10 0	5 0	Mar., 1902	6 5 0	6 7 6
Nundydroog, g., Colar Fields	242,000	10 0	1 6	Nov., 1901	2 0 0	2 2 6
Ooregum, g., Colar Fields	290,000	10 0	1 6	Dec., 1901	2 5 0	2 7 6
Ooregum, pref., g., Colar Fields	240,000	10 0	1 6	Dec., 1901	2 16 3	2 18 9
African:						
British S. Africa, ch'd S. Africa	5,000,000	1 0 0	rts.	May, 1899	4 0 6	4 2 6
Cape Copper, S. Africa	600,000	2 0 0	8 0	Jan., 1902	4 12 6	4 17 6
Cape Copper, pref., S. Africa	150,000	2 0 0	8 0	Jan., 1902	4 7 6	4 12 6
City and Sub'n (New), g., Transvaal	1,360,000	4 0 0	3 0	Aug., 1899	6 17 6	7 2 6
Crown Reef, g., Transvaal	120,000	1 0 0	18 0	Nov., 1899	17 15 0	18 0 0
De Beers Con., d., Cape Colony	3,950,000	5 0 0	£1	Sept., 1901	45 11 3	45 13 9
Ferreria g., Transvaal	90,000	1 0 0	10 0	Jan., 1902	24 5 0	24 15 0
Geldenhuis Est., g. Transvaal	200,000	1 0 0	10 0	Aug., 1899	7 0 0	7 5 0
Henry Nourse, g., Transvaal	125,000	1 0 0	10 0	Aug., 1899	9 12 6	9 17 6
Jagersfontein, d., Orange F. S	1,000,000	5 0 0	6 0	Dec., 1900	27 7 6	27 12 6
Joh'n'b'g Con. Invet., S. Africa	2,750,000	1 0 0	2 0	Nov., 1899	3 13 9	3 16 3
Jubilee, g., Transvaal	50,000	1 0 0	5 0	Aug., 1899	6 10 0	6 15 0
Langlaagte Est., g., Transvaal	470,000	1 0 0	3 0	Sept. 1899	4 8 9	4 11 3
May Con., g., Transvaal	290,000	1 0 0	0 6	Aug., 1899	4 17 6	5 2 6
Meyer & Charlton, g., Transvaal	100,000	1 0 0	3 0	Feb., 1902	5 17 0	6 2 6
Namaqua, c., Cape Colony	200,000	2 0 0	3 0	Feb., 1902	4 0 0	4 5 0
Primrose (New), g., Transvaal	300,000	1 0 0	6 0	Aug., 1899	4 17 6	5 0 0
Rand Mines, g., S. Africa	1,795,956	5 0	15 0	Aug., 1899	11 13 9	11 16 3
Robinson, g., Transvaal	2,750,000	5 0 0	8 0	Aug., 1899	10 17 6	11 0 0
Sheba, g., Taansvaal	1,100,000	1 0 0	5 0	Feb., 1902	1 6 3	1 8 9
Sim. & Jack Prp., g., Transvaal	5,000,000	5 0 0	4 0	July, 1899	7 17 6	8 0 0
Wolhuter, g., Transvaal	860,000	4 0 0	2 0	Feb., 1899	5 12 6	5 15 0
.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....

c.—Copper. d.—Diamonds. g.—Gold. l.—Lead. s.—Silver. *Ex-dividend.

PARIS. Feb. 13.

Name of Company.	Country.	Product.	Capital Stock.	Par value.	Latest divs.	Prices. Opening.	Prices. Closing
			Francs.	Fr.	Fr.	Fr.	Fr.
Acieries de Creusot	France	Steel mfrs	27,000,000	2,000	85.00	1,725.00	1,730.00
" " Firminy	"	" "	3,000,000	500	200.00	2,800.00	2,610.00
" " Huta-Bank	Russia	Iron and Steel	.....	500	.....	3,500.00	3,475.00
" " la Marine	France	Steel mfrs	20,000,000	500	65.00	1,375.00	1,387.00
Anzin	"	Coal	.....	.....	320.00	5,201.00	5,251.00
Boleo	Lower Cal	Copper	.....	500	176.00	2,000.00	1,980.00
Briansk	Russia	Coal and Iron	.....	500	.....	423.00	425.00
Champ d'Or	S. Africa	Gold	3,375,000	25	3.75	40.00	41.25
Courrieres	France	Coal	600,000	300	90.00	2,275.00	2,250.00
Dombrowa	Russia	"	.....	500	75.00	980.00	980.00
Dourges	France	"	12,000,000	500	1,000	24,700.00	24,700.00
Dynamite Centrale	"	Explosives	.....	500	19.00	768.00	755.00
Escombrera-Bleyberg	Spain	Lead	.....	500	50.00	848.00	830.00
Fraser River	Brit. Col'mb	Gold	250,000	25	.....	7.00	8.00
Huanchaca	Bolivia	Silver	40,000,000	125	5.00	125.00	128.00
Laurium	Greece	Zinc and Lead	16,300,000	500	25.00	418.00	410.00
Malfidano	Italy	Zinc	12,500,000	500	12.50	490.00	455.00
Metaux, Cie. Fran. de	France	Metal dealers	25,000,000	500	22.50	440.00	440.00
Mokta-el-Hadid	Algeria	Iron	18,312,500	500	35.00	821.00	821.00
Napthe Baku	Russia	Petroleum	.....	.....	.....	317.00	322.00
Napthe Nobel	"	"	.....	.....	.....	442.00	442.00
" " parts	"	"	.....	.....	.....	9,200.00	9,210.00
Nickel	N. Caled'nia	Nickel	10,000,000	250	20.00	530.00	539.00
Penarroya	Spain	Coal, etc	.....	500	55.00	1,175.00	1,050.00
Rebecca	Colo'do, U. S.	Gold	5,000,000	25	.....	1.75	1.75
Salines de l'Est	France	Salt	.....	500	6.00	205.00	205.00
Salines du Midi	"	"	.....	500	40.00	910.00	880.00
Vielle Montagne	Belgium	Zinc	9,000,000	30	30.00	552.00	559.00

TORONTO, ONT.

Name of Company.	par val	Feb. 25. H.	Feb. 25. L.	Feb. 26. H.	Feb. 26. L.	Feb. 27. H.	Feb. 27. L.	Feb. 28. H.	Feb. 28. L.	Mar. 1. H.	Mar. 1. L.	Mar. 3. H.	Mar. 3. L.	Sales
Ontario :														
Golden Star	1	.03½	.02⅜	.03½	....	.03	.....	.02¾	.....	.02½	.....	.....	.....	.....
British Columbia :														
Cariboo McK	1	.24	.21½	.24	.21	.25	.22½	.24	.21	.25	.22	.....	.....	.....
Center Star	1	.36	.33	.37	.30	.35	.31	.36	.32	.36	.32½	.....	.....	.....
Crows, N. C	25	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Deer Trail	1	.02¾	.....	.08⅛	.02½	.03¼	.02⅝	.03½	.02¼	.03¼	.02¾	.....	.....	.....
Fairview	1	.04¼	.03	.04	.03¼	.04	.03¾	.04¼	.03⅜	.04¼	.03½	.....	.....	.....
Morrison	1	.....	.....	.06	.02⅜	.06	.02½	.06	.02⅜	.06	.02¼	.....	.....	.....
Mt. Lion	1	.36	.33	.35	.32½	.36	.32	.38	.32	.37	.32½	.....	.....	.....
North Star	1	.26	.23½	.26	.23¼ †	.24	.21½	.25	.21½ †	.25	.21½	.....	.....	.....
Payne	1	.30	.27	.30	.26½	.30	.25	.30	.25	.30	.25	.....	.....	3,000
Rambler	1	.90	.80	.92	.78	.80	.75	.86	.75	.88	.75	.....	.....	.....
Republic	1	.09¾	.08¾	.10¼	.09	.11	.09	.10	.09½	.10¼	.09¼	.10	.....	5,500
Virtue	1	.25	.20	.25	.20½	.25	.20	.25	.20	.25	.20	.....	.....	.....
War Eagle Cons	1	.11½	.10	.12½	.10½	.11

CHEMICALS, MINERALS, RARE EARTHS, ETC. CURRENT WHOLESALE PRICES.

	Cust.	Meas.	Price.
Abrasives—			
Carborundum, f.o.b. Niagara Falls, Powd., F. FF. FFF..	lb.		$0.08
Grains	"		.10
Corundum, N. C	"		.07@.10
Chester, Mass	"		.04½@.05
Barry's Bay, Ont			.07¼@.09½
Crushed Steel, f. o. b. Pittsburg	"		.05½
Emery, Turkish flour, in kegs.	"		.03½
Grains, in kegs	"		.05@.05½
Naxos flour, in kegs	"		.03½
Grains, in kegs	"		.05@.05½
Chester flour, in kegs	"		.03½
Grains, in kegs	"		.05@.05½
Peekskill, f.o.b. Easton, Pa., flour, in kegs	"		.01½
Grains, in kegs	"		.02½
Crude, ex-ship N. Y.: Abbott (Turkey)	lg. ton		26.50@30.00
Kuluk (Turkey)	"		22.00@24.00
Naxos (Greek) h. gr	"		.26.00
Garnet, as per quality	sh. ton		25.00@35.00
Pumice Stone, Am. powd	lb.		.01½@.02
Italian, powdered	"		.01½
Lump, per quality	"		.04@.40
Rottenstone, ground	"		02½@.04½
Lump, per quality	"		.03@.20
Rouge, per quality	"		.10@.30
Steel Emery, f.o.b. Pittsburg	"		.07
Acids—			
Boracic, crystals	"		.10¾@.11
Powdered	"		.11¼@.11½
Carbonic, liquid gas			.12½
Chromic, crude			.20
Hydrofluoric, 30%	"		.05
48%	"		.05
Best			.25
Sulphurous, liquid anhy	"		.06
Alcohol—Grain	gal.		2.51
Refined wood, 95@97%	"		.60@.65
Purified	"		1.20@1.50
Alum—Lump	100 lbs.		1.75
Ground	"		1.80
Powdered	"		3.00
Chrome, com'l	"		2.75@3.00
Aluminum—			
Nitrate	lb.		1.50
Oxide, com'l. common	"		.06½
Best	"		.20
Pure	"		.80
Hydrated	100 lbs.		2.60
Sulphate, pure	"		1.50@2.00
Com'l	"		1.15@1.25
Ammonia—			
Aqua, 16°	lb.		.03
18°	"		.03¼
20°	"		.03¾
26°	"		.05½
Ammonium—			
Carbonate, lump	"		.08¼@.08½
Powdered	"		.09¼@.09½
Muriate, grain	"		.05¾
Lump	"		.08½
Nitrate, white, pure (99%)	"		.12
Phosphate, com'l	"		.09
Chem., pure	"		.60
Antimony—Glass	"		.30@.40
Needle, lump	"		.05½@.06
Powdered, ordinary	"		.05¾@.07¼
Oxide, com'l white, 95%	"		.09½
Com'l white, 99%	"		.12
Com'l gray	"		.07
Sulphuret com'l	"		.16
Arsenic—White	"		.03¼@.03¾
Red	"		.06¼@.07¼
Asphaltum—			
Ventura, Cal	sh. ton		32.00
Cuban	lb.		.01½@.03½
Egyptian, crude	"		.05½@.06
Trinidad, refined	sh. ton		35.00
San Valentino (Italian)	lg. ton		16.00
Seyssel (French), mastic	sh. ton		21.00
Gilsonite, Utah, ordinary	lb.		.03
Select	"		.03¾
Barium—			
Carb. Lump, 80@90%	sh. ton		25.00@27.50
92@98%	"		28.00@29.00
Powdered, 80@90%	lb.		.01¾@.02
Chloride, com'l	100 lbs.		1.67½@1.76
Chem. pure cryst	lb.		05
Nitrate, powdered	"		.05½

	Cust.	Meas.	Price
Barium -			
Oxide, Am. hyd. cryst	lb.		$0.03¾
Sulphate (Blanc Fixe)	"		.02
Barytes—			
Am. Crude, No. 1	sh. ton		9.00
Crude, No. 2	"		8.00
Crude, No. 3	"		7.75
German, gray	"		14 50
Snow white	"		17.00
Bauxite—Ga. or Ala. mines:			
First grade	lg. ton		5.50
Second grade	"		4.75
Bismuth—Subnitrate	lb.		1.40
Subcarbonate	"		1.65
Bitumen—"B"	"		.03½
"A"	"		.05
Bone Ash	"		.02¼@.02½
Borax	"		.07¼@.07½
Bromine	"		.40
Cadmium—Metallic	"		1.40
Sulphate	100 lbs.		2.00@2.50
Calcium—Acetate, gray	"		1.30
" brown	"		.90
Carbide, ton lots f.o.b. Niagara Falls, N. Y., or Jersey City, N. J	sh. ton		75.00
Carbonate, ppt	lb.		.05
Chloride, com'l	100 lbs.		.75@.80
Best	"		1.00
Cement—			
Portland, Am., 400 lbs	bbl.		1.70@1.90
Foreign	"		1.65@2.25
"Rosendale," 300 lbs	"		.75
Slag cement, imported	"		1.65
Ceresine—			
Orange and Yellow	lb.		.12
White	"		.13½
Chalk—Lump, bulk	sh. ton		2.45
Ppt. per quality	lb.		.03¾@.06
Chlorine—Liquid	"		.30
Water	"		.10
Chrome Ore—			
(50% ch.) ex-ship N. Y	lg. ton		24.75
Sand, f.o.b. Baltimore	"		33.00
Bricks, f.o.b. Pittsburg	M		175.00
Clay, China—Am. com., ex-dock, N. Y	lg. ton		8.00
Am. best, ex-dock, N. Y	"		9.00
English, common	"		12.00
Best grade	"		17.00
Fire Clay, ordinary	sh. ton		4.25
Best	"		6.00
Slip Clay	"		5.00
Coal Tar Pitch	gal.		.08
Cobalt—Carbonate	lb.		1.75
Nitrate	"		1.50
Oxide—Black	"		2.20@2.30
Gray	"		2.28@2.40
Smalt, blue ordinary	"		.06
Best	"		.20
Copperas	100 lbs.		.30@.35
Copper—Carbonate	lb.		.18@.19
Chloride	"		.27
Nitrate, crystals	"		.35
Oxide, com'l	"		.19
Cryolite	"		.06½
Explosives—			
Blasting powder, A	25 lb. keg		2.65
Blasting powder, B	"		1.40
"Rackarock," A	lb.		.25
"Rackarock," B	"		.18
Judson R.R. powder	"		.10
Dynamite (20% nitro-glycerine)	"		.13
(30% nitro-glycerine)	"		.14
(40% nitro-glycerine	"		.15
(50% nitro-glycerine)	"		.16½
(60% nitro-glycerine)	"		.18
(75% nitro-glycerine)	"		.21
Glycerine for nitro (32 2-10° Be.)			.12⅞@.13
Feldspar—Ground	sh. ton		8.00@9.00
Flint Pebbles—Danish, Best	lg. ton		14.75
French, Best			11.75
Fluorspar—			
Am. lump, 1st grade	sh. ton		$14.40
2d grade	"		13.90
Gravel and crushed, 1st gr	"		13.40
2d grade	"		12.40
Ground, 1st grade	"		17.90
2d grade	"		16.50
Foreign, lump	"		8.00@12.00
Ground	"		11.50@14.00
Fuller's Earth—Lump	100 lbs.		.75
Powdered	"		.85

	Cust.	Meas.	Price
Graphite—Am. f.o.b. Providence, R. I., lump	sh. ton		$8.00
Pulverized	"		30.00
German, som. pulv	lb.		.01¼@.01½
Best pulverized	"		.01½@.02
Ceylon, common pulv	"		.02¾@.03½
Best pulverized	"		.04@.08
Italian, pulv	"		.01¼
Gypsum—Ground	sh. ton		8.00@8.50
Fertilizer	"		7.00
Rock	lg. ton		4.00
English and French	"		14.00@16.00
Infusiorial Earth—Ground.			
American, best	"		20.00
French	"		37.50
German	"		40.00
Iodine—Crude	100 lbs.		2.45
Iron—Muriate	lb.		.05
Nitrate, com'l	"		.01¼
True	"		.04
Oxide, pure copperas col	"		.05@.10
Purple-brown	"		.02
Venetian red	"		.01@.01½
Scale	"		.01@03
Kaolin—(See Clay. China.)			
Kryolith—(See Cryolite.)			
Lead—Acetate, white	"		.07¾@.08
Brown	"		.06
Nitrate, com'l	"		.06½
" gran	"		.08¼
Lime—Com., abt. 250 lbs	bbl.		.80
Finishing	"		.90
Magnesite—Greece.			
Crude (95%)	lg. ton		6.50@7.00
Calcined	sh. ton		14.00@15.00
Bricks	M		170.00
Am. Bricks, f.o.b. Pittsburg	"		175.00
Magnesium—			
Carbonate, light, fine pd	lb.		.05
Blocks	"		.07@.09
Chloride, com'l	"		.01¾
Fused	"		.20
Nitrate	"		.60
Sulphate	100 lbs.		.75@.95
Manganese—Powdered, 70@75% binoxide	lb.		.01¼@.01½
Crude, pow'd. 75@85% binoxide	"		.01½@.02¼
85@90% binoxide	"		.02¼@.03¼
90@95% binoxide	"		.03¼@.05½
Carbonate	"		.16@.20
Chloride	"		.04
Ore, 50%, Foreign	unit		.20@.21
Domestic	"		.30
Marble—Flour	sh. ton		6.00@7.00
Mercury—Bichloride	lb.		.77
Mica—N. Y. gr'nd, coarse	"		.03@.04
Fine	"		.04@.05
Sheets, N. C., 2x4 in	"		.30
3x3 in	"		.80
3x4 in	"		1.50
4x4 in	"		2.00
6x6 in	"		3.00
Mineral Wool—			
Slag, ordinary	sh. ton		19.00
Selected	"		25.00
Rock, ordinary	"		32.00
Selected	"		40.00
Nickel—Oxide. No. 1	lb.		1.00
No. 2	"		.60
Sulphate	"		.20@.21
Oils—Black, reduced 29 gr.:			
25@30, cold test	gal.		.09¾@.10¼
15, cold test	"		.10¾@.11¼
Zero	"		.11¾@.12¾
Summer	"		.09¼@.09¾
Cylinder, dark steam ref	"		.08¾@.10¼
Dark, filtered	"		.11¼@.15¾
Light filtered	"		.14¾@.17¾
Extra cold test	"		.21¾@.26¾
Gasoline, 86°@90°	"		.14@.19
Naphtha, crude, 68°@72°	bbl.		9.05
"Stove"	gal.		.12
Linseed, domestic raw	"		.62@.63
Boiled	"		.65
Calcutta, raw	"		.85
Ozokerite	lb.		.11½
Paints and Colors—			
Chrome green, common	"		.05
Pure	"		.16
Yellow, common	"		.10¼
Best	"		25
Lampblack, com'l	"		.04½
Refined	"		.07
Litharge, Am. powd	"		.04¾@.05¼
English flake	"		.08¾@.09
Glassmakers'	"		.07¼@.07½

	Cust.	Meas.	Price
Paints and Colors—			
Metallic, brown	sh. ton		$ 19.00
Red	"		16.00
Ocher, Am. common	"		9.25@10.00
Best	"		21.25@25.00
Dutch, washed	lb.		.04¾
French, washed	"		.01¼@.01⅞
Orange mineral, Am	"		.07¼@.07¼
Foreign, as to make	"		.07¾@.11⅜
Paris green, pure, bulk	"		.11¼@.11½
Red lead, American	"		.05¼@.05¾
Foreign	"		.06⅜@.08
Turpentine, spirits	gal.		.44¼
White lead, Am., dry	lb.		.04¼@.04½
American, in oil	"		.05¼@.05¾
Foreign, in oil	"		.07¼@.09¼
Zinc, white, Am., ex dry	"		.04⅜@.04⅝
American, red seal	"		.06½
Green seal	"		.07
Foreign, red seal, dry	"		.05⅜@.08
Green seal, dry	"		.06½@.06½
Potash—			
Caustic, ordinary	"		.04⅞@.06
Elect. (90%)	"		.06½
Potassium—			
Bicarbonate cryst	"		.03¼
Powdered or gran	"		.14
Bichromate, Am	"		.08⅛@.08¼
Scotch	"		.08⅛@.09
Carbonate, hydrated	"		.04@.04¼
Calcined	"		.03½@.03¾
Chromate	"		.35
Cyanide (98@99%)	"		.23
Kainit	lg. ton		9.05
Manure salt, 20%	100 lbs.		.66
Double Manure salt, 48@53%	"		1.12
Muriate, 80@85%	"		1.83
95%	"		1.86
Permanganate	lb.		.09½@.10¼
Prussiate, yellow	"		13½@.13⅝
Red	"		.36
Sulphate, 90%	100 lbs.		2.11
96%	"		2.14
Sylvinit	unit		.36½
Quartz—(See Silica).			
Salt—N. Y. com. fine	sh. ton		2.00
N. Y. agricultural	"		1.50
Saltpetre—Crude	100 lbs.		3.50@3.55
Refined	"		4.37½@4.62½
Silica—Best foreign	lg. ton		10.00@11.00
Ground quartz, ord	sh. ton		6.00@8.00
Best	"		12.00@13.00
Lump quartz	"		2.50@4.00
Glass sand	"		2.75
Silver—Chloride	oz.		.65
Nitrate	"		37½
Oxide	"		85.@1.10
Sodium—			
Bichromate	lb.		.06¼
Chlorate, com'l	"		.08⅛@.08½
Hyposulphite, Am	100 lbs.		1.60@1.65
German	"		1.70@1.90
Peroxide	lb.		.45
Phosphate	"		.02½@.03
Prussiate	"		.10½@.11
Silicate, conc	"		.05
Com'l	"		.01
Sulphate, com'l	100 lb.		.77½
Sulphide	lb.		.01¼
Sulphite crystals	"		.02½
Sulphur—Roll	100 lbs.		1.85
Flour	"		1.90
Flowers, sublimed	"		2.15
Talc—N. C., 1st grade	sh. ton		13.75
N. Y., Fibrous, best	"		10.20
French, best	100 lbs.		1.25
Italian, best	"		1.62½
Tar—Regular	bbl.		1.95
Oil barrels	"		3.65
Tin—Crystals	lb.		.20@21½
Oxide	"		.42
Uranium—Oxide	"		2.25@3.00
Zinc—Metallic, ch. pure	"		.07@.09⅞
Carbonate	"		.15
Chloride	"		.05
Dust	"		.05⅝@.05¾
Sulphate	"		.02½@.02¾

THE RARE EARTHS.

	Cust.	Meas.	Price
Boron—Nitrate	lb.		$1.50
Calcium—Tungstate (Scheelite)	"		.80
Cerium—Nitrate	"		11.00
Didymium—Nitrate	"		35.00
Erbium—Nitrate	"		40.00
Glucinum—Nitrate	"		20.00
Lanthanum—Nitrate	"		36.00
Lithium—Nitrate	oz.		.60
Strontium—Nitrate	lb.		06⅞@.07
Thorium—Nitrate 49@50%	"		5.00
Uranium—Nitrate	oz.		.25
Yttrium—Nitrate	lb.		40.00
Zirconium—Nitrate	"		8.00

NOTE.—These quotations are for wholesale lots in New York unless otherwise specified, and are generally subject to the usual trade discounts. Readers of the ENGINEERING AND MINING JOURNAL are requested to report any corrections needed, or to suggest additions which they may consider advisable. See also Market Reviews.